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New Members	139	565	1131	1953
Total at end of year	996	1458	2379	3965

The new branches of the Association created this year are situated at Bishop Auckland, Bristol, Crewe, Essex, Exeter, Hereford, Lincoln, Leicester, Nottingham, Plymouth, E. Suffolk, Swansea, Thanet, Tottenham, and York, making a present total of 40 branches in England and Wales. In addition to the above, we record with pleasure the continuation of the activities of the affiliated Association in Ireland under conditions of difficulty which command our utmost sympathy. Mr Robison has founded an affiliated Association in Ceylon, and, later, he and Mr Sivagurunathan have developed branches of it at Colombo and other centres. We join with them in expressing our thanks to Mr E. B. Denham for his great help and all his educational work in Ceylon, and offer our congratulations on his appointment as Colonial Secretary for Mauritius. The enthusiasm has been very marked, and a successful Summer School has been held. The Ceylon Association has published Mr Denham's address (25 cents and postage), and a paper by Mr Sivagurunathan on "Aspects of Modern Geography" (35 cents and postage). Applications to be sent to Hon. Sec., Ceylon Geographical Association, Ananda College, Colombo. The growth of our membership in India leads us to hope that branches at Indian centres will soon be helping education and international understanding in that great country. The work of our branches this year has been marked by widespread co-operation with local education authorities, and many interesting enterprises have been carried through by our energetic branch secretaries, to whom our best thanks are due. Several branches have taken up serious work, such as co-operative research in psychological problems of geography teaching, preparation of bibliographies, regional surveys, etc., etc. A great deal of the marked increase in our membership is due to the energy of branch secretaries ; in some cases as many as 100 new members have been added.

It is only by this wide increase in the number of people actively interested in the improvement of geographical teaching that the subject will win the place all teachers of it desire it to have in schools and universities. It is also only in this way that the Assocation has been enabled to maintain its work and its magazine at the old level. Thanks are specially due to local secretaries who have collected and sent to the Central Office in batches the subscriptions of their members.

Special thanks are due to our 1920 President, Sir Charles P. Lucas, for his energy on our behalf, and especially for his letter to all Directors of Education and many other persons throughout the British Empire. This has brought us much help, and we have a growing feeling of the friendly support given by inspectors and other officers at home and abroad.

During the year the Association has issued a number of hand maps and also two reprints, "The Far Eastern Question in its geographical setting" (2s. 1d., post free), by Prof. Roxby, to whom the Association's best thanks are due, and the second edition of our "Scheme for a first course in Geography in Schools," with an additional scheme for Standards I. and II. drawn up by Miss Brown Smith and Miss D. M. Forsaith, of the Goldsmith's College, London University (1s. 1d., post free).

It is estimated that at least ten Summer Schools in geography were held in Great Britain in 1920, and the majority were very well attended.

There can be no doubt that the uphill fight for the better recognition of geographical work in education is progressing, however difficult the obstacles may still be. Honours Degrees in Geography may be taken at Cambridge, London, Liverpool, Leeds, and Wales, and other universities are discussing the matter, and will doubtless soon follow suit. The opening of the London University Diploma to external students was a welcome move, which will benefit many experienced teachers. The Board of Education's new arrangements for grants to teachers who take a year off for special study should be specially useful to geography teachers, many of whom found no diploma in existence in their student days. Several universities now offer a diploma in geography on one year's residence, and members who wish to take advantage of this are advised to write to the Central Office.

The Association maintains its long standing requests to the Board of Education for more recognition, especially in the upper forms of secondary schools and in the awards of national scholarships. We know we have the general public thoroughly with us in this matter, and the objections still made are technical rather than essential. It is hoped that every member of the Association will try to bring public opinion to focus here, so that we may overcome the hesitations of official conservatism. The continuous growth in importance of international questions makes our claim ever stronger. **Geographical education is one of the essentials for the development of international peace.**

It is a matter of special pleasure to return thanks for a flood of appreciative letters from members of the Association, a large number of whom have sent gifts to help us over a difficult transition. The immense growth of the Association involved installation of mechanical devices for addressing envelopes, purchase of large files, and of many other matters of office furniture and equipment. We have made a great effort not to increase the subscription and not to reduce the magazine, and the result has been that there has been too little money to meet the special expenses just mentioned. The gifts of members have tided the Association over this difficulty, and we are very grateful for their generosity.

H. J. FLEURE.

Editorial.

THE recent death of Peter Kropotkin removes one of the great personalities of our time, a thinker and worker in many fields, and one of the most far-sighted friends of the geographical movement. He was born in 1842, a member of the Russian nobility, and began his scientific work by explorations in the Amur province and Manchuria. Suess and other writers used his results freely in their synthetic works, and he drew from those results conclusions as to the geography of Asia, which he communicated, *inter alia,* to the Royal Geographical Society in 1904, and worked up into books on the orography and the dessication of Asia. Sir H. J. Mackinder also contributed his views to the Society at the same time. Kropotkin's experiences in the East made him break with the traditions in which he had been brought up, and he became a revolutionary thinker working out a philosophical basis for a better society, glimpses of which can be attained by the student of two of his most important little books, " Mutual Aid " (1902) and " Fields, Factories and Workshops " (1889). His work as a revolutionary led him to prison and exile, and he remained in Western Europe over forty years till the overthrow of Tsarism in 1917. As an old man, he then returned to help his stricken country, but found his opportunities cut off by the rise of Bolshevism, with which he could have no sympathy. He was not such an extreme pacifist as Tolstoi, but he did not accept the doctrines of Marx; he was concerned with constructive ideals based on the spread of mutual aid, goodwill, and understanding. His " Memoirs of a Revolutionist " is a book for all serious thinkers, and for geographers interested in European problems most of all. To England he gave much service through his articles in the " Nineteenth Century " Review, surveying periodically the progress of science, as well as through his contributions to social and political discussions. His friendship for Professor Herbertson gives him a more intimate claim on the affection of members of the Geographical Association, but his universal and simple kindliness made him beloved by all who met him and had the opportunity of sharing, if not always his views, at least something of his luminous belief in his fellowmen.

SUMMER Schools will not be held this year by Mr Beckit at Oxford, by Leeds University, or by the University of Wales at Aberystwyth. Mr H. V. Davis proposes to hold one in August at Chamonix, and the work will include training in mountain craft as well as practical observation in all branches of open air science and geography. If Mr Davis can fit it in, he also proposes to hold his usual summer school in the N. Wales mountains. Anyone wishing to attend either should send a stamped addressed envelope to Mr H. V. Davis, Noddfa, Wistaston, Crewe, who has issued a 32 page book on Snowdon, price 8d., post free. There will be a Summer School at Cambridge (apply to the University Registrar), at Bangor (July 30th—August 20th), under Mr W. E. Whitehouse (apply to the Principal, Normal College, Bangor), and the Board of Education is organising various schools as usual. A school will be held in Guernsey August 9th—26th inclusive. There will be a course of lectures on the Historical Geography of Europe and its new problems by Prof. Fleure, and a course on the Effects of European Industrialism on extra-European countries by Mr W. H. Barker. Special attention will be given to the study of the Channel Islands and the geographical matters they illustrate. Further arrangements will be announced to intending students, who should apply, enclosing stamped addressed envelope, to Miss Fleming, 1, Marine Terrace, Aberystwyth.

THE thanks of the Editor and the Author are cordially offered to Mr E. E. Gomersall, B.Sc., for the excellent maps he has compiled to accompany the article in this number by Dr. Haddon. These are not the first maps he has done for this magazine, and his work is widely appreciated by the members of the Association.

OWING to pressure on our severely limited space for this number, we are unable to publish an article relating to School Journeys, but we wish to take this and every opportunity of commending to teachers of geography the work of the School Journeys Association, which gives advice and help with the organization of this work. Teachers who wish to join that Association should send an enquiry with stamped addressed envelope to Mr G. G. Lewis, L.C.C., Ellershe Road School, London, W. 12, the author of " Longer School Journeys " (pub. Pitman's, 3s.).

WE are asked to inform our readers that the eighth Italian Geographical Congress will be held at Florence, March 29th—April 5th, 1921. Any efforts on the part of British Geographers to get into touch with Italian fellow-workers are of special value at the present time.

THE Civic Education League is conducting a tour in Belgium March 24th —April 7th for a party of 40. This commendable enterprise should interest members of the Geographical Association. Details may be obtained by enquiries, sending a stamped addressed envelope, to the Secretary, Miss M. Tatton, Leplay House, 65, Belgrave Road, London, S.W. 1.

H. J. FLEURE.

TWO nine days' Motor Tours have been arranged by Mr E. E. Lupton, and will be conducted by Mr C. B. Fawcett, M.Sc., B.Litt., of Leeds University.

FIRST TOUR.—August 6th to August 14th, from Bradford via The Fens, S. Downs, Oxford, Severn Valley, and Peak.

SECOND TOUR.—August 27th to September 4th, from Bradford via the Lake District, Clydesdale, The Trossachs, Edinburgh, Berwick, and the Yorkshire Dales.

Fare for each tour, £15. Booking fee, £5. Balance to be paid before June 30th.

Apply for details, ENCLOSING STAMPED ADDRESSED ENVELOPE, to Mr E. E. Lupton, 73, Bierley Lane, Bradford, Yorks.

NOTICE FROM LIVERPOOL BRANCH.

Our Illustration Sub-Committee has a store of illustrations, and will be very glad to loan some of these to any other branch of the Geographical Association in return for an exchange loan from them. Possibly a six months' exchange could be effected. We have many views of places, especially South Africa and Solomon Isles, showing industries and life in other lands, but are short of illustrations of land forms. Enquiries to Miss Cleary, 89. Ashbourne Road, Liverpool, S.

Will correspondents please remember to enclose stamped addressed envelope if they wish for a reply.

Orbis Terrestris.

Presidential Address by PROFESSOR GILBERT MURRAY, L.L.D., F.B.A., M.A.

§1. ALL those of us who have listened to the voices of the great philosophers of antiquity are familiar with their famous conception of the universe as One Great City of Gods and Men. That conception became the formative principle of most of the higher thought of the Roman Empire. It lay at the centre of their ethics, interpreting the duty of man towards all creation as identical with the duty of a patriotic citizen towards the city or country in whose love and service he lives. At the centre of their religion, inasmuch as God was the King and Founder of this City, and His will both the cause of its being and the force which guided it towards its good. At the centre of their political theory, since the good governor was he who, losing all thought of his own special interests, made himself the instrument of the divine world-purpose, the "minister of the providence of God," ὑπουργὸς Τῆς θείας προνοίας. It held the educated world at the time of the beginnings of Christianity, and for the most part passed without much change into the shell of the new religion, at least on its more philosophic side ; with the result that by far the greater number of our common religious metaphors are apparently derived from it : for instance, the use of "high" and "low" in a metaphorical sense, Providence, Free Will, conscience, humanity, compassion, and the like.

This great ethical conception was accompanied, as most philosophies are, by a certain orthodox or generally accepted theory of the physical universe. And Mr Edwyn Bevan (*Stoics and Cynics*, pp. 109-118) has pointed out how beautifully the two theories fitted one another. We should probably say that, speaking roughly, the moral theory was true, whereas the physical theory was demonstrably false. But all the same they fitted.

It was a delightfully clear and definite and intellectually manageable universe which formed the One Great City. The earth was the physical centre, and man was the moral centre, directly related to God inasmuch as his soul was an effluence or emanation of God. The planets went round and round, on courses which were mathematically worked out on a highly complicated hypothesis with an extremely small margin of error. The primitive conceptions of "up" and "down" had not been disturbed : Heaven was up above. You could see it shining on a clear night, the place where the pure souls, purged of grossness and therefore naturally grown lighter, have risen to the height which corresponded with their specific gravity, and pass their age-long beatitude in contemplating the orbits of the stars, hearing the inexpressible music of the spheres in their courses, and enjoying the infinite beauty of God and the works of His creative thought. For God and His love was in all the material world, though perhaps not equally in every part ; all the Kosmos was alive and sentient and united in its service of Him ; and no evil could befall any one remote living creature but it vibrated through the whole ; and the blessed ones were sad and the stars shivered in "compassion," or "sympatheia," with the suffering of the smallest and meanest of their brethren. Such a universe was, in the old phrase, *eusunopton*—capable of being seen all together, or contemplated as one. And in such a world it was comparatively easy for man to see his own place and his neighbour's place, to realize their common duty, and to contemplate with confidence rather than terror the before and after of his conscious life.

"It was not the triumph of Christianity," says Mr Bevan, "which was fatal to this view of the world," which he connects especially with the name of Posidonius. "Perhaps indeed the view never had more splendid expression than in the great Christian poem which came from the heart of mediæval Italy. What was fatal to it was the triumph of Copernicus.

Man, if he limited his view to the material world, was once more a mote in an unfathomable universe. '*Le silence eternel de ces espaces infinies m'effraie.*' It was a few generations after Corpernicus that Pascal wrote that. For centuries man had held in his hands a certain chart of the world which gave him assurance and comfort. And now that chart was discovered to be no good."

I will not attempt to follow the terrific consequences which, from the point of view of a mediæval Christian or an ancient Stoic, flowed from the disestablishment of this anthropocentric universe. If Copernicus and Galileo were right, Man was not the centre of things, not the child or effluence of God ; he was a species which had done well in a local struggle with other species : his history, as Mr Balfour has phrased it, " a brief and discreditable episode in the life of one of the meaner planets." He was an item of little account in the whole. That was not Heaven which he saw on the clear nights. It was a bottomless void. There was no higher and lower, there was no up and down. And in the vast scheme of biological evolution, where it was possible to descry what elements of conduct made for success and survival, they certainly did not seem to be, on the face of it, those recommended by the sages or the saints. I will not develop this line of thought or even criticise it, except to suggest that the really surprising thing seems to be that so utter a revolution in fundamental beliefs made so little difference, if any, in human conduct.

§2. The thought which I do wish to pursue is quite a different one. I trust it will not appear merely fanciful. If we turn from a contemplation of the universe to that of the earth, and content ourselves with that limited though extensive field of knowledge, I am inclined to suggest that within recent times a process has taken place in our attitude towards the earth which is the exact opposite to that which I have described in our ancestors' attitude towards the whole universe. Of course their belief was erroneous, and ours, we hope, is based on real knowledge. But, apart from that, I think it is fair to say that, while our ancestors were through scientific discovery deprived of their well-charted intelligible and righteous anthropocentric universe, and cast out naked into a blinding immensity, in the course of the last few generations civilized man has performed a reverse process with respect to the Earth. The earth has become comparatively small, limited, well ascertained and, I may say, rational. Man is no longer a wanderer on the face of a globe full of unknown and unimagined spaces, inhabited by strange and unintelligible beings with whom he has nothing in common and who may unexpectedly destroy him. He is at home in the earth, as the old Stoic imagined himself to be at home in the universe. Our claim is a more modest one ; but it looks as if, amid many failures and drawbacks, we were really accomplishing it. We have explored not the whole surface of the globe, but at least so much of it that we can be certain that there are no very great surprises awaiting us ; nothing, for instance, greater than the surprises produced by Sir Aurel Stein from Eastern Turkestan. We know the stuff it is made of, its various strata, their qualities and their comparative age, we see the rivers and the mountain ranges in terms of intelligible processes. We are beginning to understand the type of human being likely to be turned out by a particular environment, and the sort of social customs and ways of behaviour that it produces. Our geography reaches at one end to geology and at the other to social anthropology. To use Aristotle's word again, we tread an Earth which is EUSUNOPTON, capable of being conceived as one whole. We members of the modern civilized world cannot indeed, like the ancient Stoic, imagine ourselves an integral element in the life of the stars, so that our soul is of the same fire that makes them shine, while its suffering flecks them with darkness ; but we can, and I think do, regard ourselves as acting over large parts of the earth as "ὑπουργὸι Τῆς θείας προνοίας," ministers of the Divine Providence, and I hope that we can at the same time begin to say in a clearer sense than was possible to the ancients, *Homo sum, nihil humani a me alienum puto.*

Of course, in pursuing this line of thought, I do not forget that I am for the moment talking of mankind as if it consisted of philosophers or intellectuals or geographers. I do not forget that the earth is full of what Nietzsche calls " backward-thinking men " and of men in whose life thought plays altogether a negligible part. They are the majority. It may be that they govern us in real life ; but we need not let them interrupt our thought.

We are becoming at home in the world. If you look back in history you find at every epoch or in every society that there is a sort of precinct within which the world is understood or at least understandable, and outside of which rage the unknown heathen. There is the Hellenic world, within which there are doubtless many wicked and hateful persons, but still they are Hellenes and have customs upon which you can calculate. Their speech may be unintelligible to you, but at least it is a proper language. Outside are the *barbaroi* making noises like birds, and capable of anything. Many of them, no doubt, very wise and virtuous, but somehow not ever people that you can be at home with. A philosopher like Plato tries to humanize the usages of war ; a publicist like Isocrates tries to establish a general international concord. But both of them stop at the limits of the Hellenic world, and know that, for practical purposes, it is no good talking about such things with barbarians. To the men of the Middle Ages the precinct was Christendom ; within reigned, ideally at least, though subject to infinite allowances for the difficulties of real life, the law of Christ ; outside were Jews and infidels, whose ways no one could understand or wished to understand. And we know that at the present day a Neapolitan who is rebuked for cruelty to animals defends himself at once on the ground that Non sono Cristiani . . . a point on which the northern nations as a rule do not agree with them.

Of course it would be absurd to pretend that there was only one precinct with a sharp edge, outside which were only the rejected. There were always no doubt several : now there are very many precincts, indeed, and they shade insensibly one into another. But this multiplication of minor precincts, I think, is the way in which the original primitive barrier breaks down. Not so very long ago a man in England who trespassed outside the bounds of his native village had to blow a horn as he went to give fair warning, unless he wished to be killed at sight. As that sharp barrier breaks and a man obtains knowledge of the next village, the next county, then of people who speak a different language, wear different clothes, have a different religion or a different colour to their skin, there may remain plenty of conscious differences and repugnances, but—with thoughtful men at least—there will not come a definite line beyond which are outlaws, between whom and yourself there are no human bonds and no moral obligation.

The essential mark of the foreigner as such, of the *barbaros,* of the heathen, is a difference which is not understood and does not explain itself. I remember, as a boy, loathing a certain man, a Frenchman, who had a particular kind of pouch under his eyes. It seemed to me to connote some indescribable wickedness. Then someone told me that it was a swelling of the lacrimal gland produced by exposure to a tropical sun ; and I loathed him no more. Why does an uncircumcised Philistine seem such a sinister being? Why in Campbell's mention of

" The whiskered Pandour and the fierce Hussar,"

does it seem at least as reprehensible of the Pandour to be whiskered as it is of the Hussar to be fierce, if not more so? Why in general is it some superficial and harmless characteristic that is generally in literature seized upon in a foreigner as a ground for shuddering at him? It is, I think, that by a process of unconscious reasoning you feel that he is doing something that you would not do without a very strong motive, and that his motive is unknown. With increased knowledge of the world we get to see the reasons for the differences of custom, and they cease to be so upsetting. It is the same with physical characteristics. Europeans are often conscious of the smell of negroes, and dislike negroes accordingly. But a very little anthropology teaches us that all human beings smell; we may find, as a friend of mine did, that a Japanese waiting maid is apt to fall in a faint at the smell of a number of Europeans and Americans sitting at dinner. That alters the state of the case. When knowledge and understanding come in, the peculiar sense of horror connected with the unknown vanishes.

Observe, it is not a question of hating and loving. All really vigorous hatred is directed towards your neighbours, relatives and rivals, whom you know and constantly rub against; and the same is true of vigorous affection. We are considering now merely the question of a precinct within which the moral law holds, and an outer darkness in which it simply does not. The case is put very clearly in an interesting passage of the philosopher Porphyry, who bases all duty and righteousness on the Logos—the Word or Reason—and deduces quite directly that a man has a complete system of duties towards all beings which share in the Logos, but no duty at all, and no power of being just or unjust, towards those which do not. It is that fence which, I think, our increase of geographical knowledge has, I will not say, merely broken down, but, as far as human beings are concerned, removed off the edges of the map of the world.

§3. At this point a critic may point out certain facts which seem to give to my reasoning the lie direct. At the present moment there are more precincts or ring fences set up in the world, with fellow creatures inside and mere vermin outside, than there have been for a great many centuries. In mere pig-headed bestial rejection of the foreigner, this country and most others have of late sometimes sunk to a point of degradation which would tempt our more enlightened grandfathers to disown us if they knew of it. That may be true enough. It is, of course, due to the war. The strain of being allies in a long war is generally more than human nature can support. And though the contrary strain of being official enemies tends, in the actual fighter, to produce a reaction of kindliness, still the sufferings and cruelties of this last war were so far beyond common anticipation that they have left a legacy of hate behind them. This condition, I would say, is altogether exceptional and will pass.

Yet that answer to my supposed critic is not sufficient. For the fact is that inter-racial contempt and dislike were on the whole growing and not diminishing in the century or century and a half before the war.

Think of Sir Joshua Reynolds' noble picture of the Prince of Otaheite, now in the National Gallery, and compare it with our current conception of a South Sea Islander to-day. Think of the romance and majesty with which the mediæval travellers endow the rulers of Cathay or the Indies, and the respect almost amounting to awe with which they speak of Arabian science. Think of the romantic poems written in the Eighteenth Century about African princes treacherously enslaved. Or, to take one specific contrast, consider on the one hand the eloquent pages about Africa in Condorcet's famous little book, "Esquisse du Progrès de l'Esprit Humain," written in the midst of the French Revolution. Condorcet has been discussing the infinite obstacles put in the way of human progress by the complicated inheritances of old societies, in which prejudice and injustice are so deeply rooted that they cannot be removed without a dangerous surgical operation. He expatiates on the great possibilities of advance that there would be if statesmen or educators with the enlightenment of the revolutionary age in their minds were to set to work upon an unspoiled people in a state of nature. And there, he says, is Africa waiting! Let all the nations of Europe recognize their joint responsibility. Let them take Africa "as a sacred trust for civilization "—the phrase is not his, but it exactly expresses his idea—and see what heights the backward but unspoilt natives can attain. He believes that it can and will be done. All that is necessary is firmly to exclude from Africa the speculator, the trader, the soldier, and—I fear he also added—the priest.

That is one side of the contrast ; the other is the History of Africa as it has really been since Condorcet's day. It is described for instance in Mr Leonard Woolf's " History of Empire and Commerce in Africa " ; and Mr Woolf, I should say, was a man who almost entirely agreed with Condorcet's general views. If ever one were tempted to accept Mr Balfour's description of the life-history of the human race as " a brief and discreditable episode in the life of one of the meaner planets," it would be when one reads of the dealings of the white races with the coloured races.

How shall we sum up the process and explain this puzzling and reactionary change that seems to have taken place? I think in the middle ages there was no clear superiority in the strength and material resources of the Western nations as compared with the East. In science, indeed, the Arabs were definitely our superiors. When it came to a fight the power of the West was by no means certain of victory. Even in the sixteenth century it is not certain who would have won the fight if it had come. There was an embassy in the time of Elizabeth led by Sir Thomas Rowe to the Court of the Great Mogul, and we possess Rowe's account of it. I think it would be true to say that the Elizabethan is struck by the strangeness of the Mogul culture, and deplores its lack of Christian doctrine, but he treats it consistently with respect, and the respect seems to be largely due to the formidable military power at the disposal of the Great Mogul. It reminds a classical scholar of that other embassy to an earlier Mongol potentate, Attila, the Hun, described in the famous fragments of the Byzantine Priscus, and epitomised in the 34th chapter of Gibbon. Priscus despised the Huns as barbarians ; . he put them outside the pale as heathens. He loathed them for their devastating cruelty. But one can see an element of awe tinging his curiosity, and eventually a deep involuntary reverence for his terrific entertainer.

What was it that chiefly altered the balance between West and East, between the white Christian European culture and that of the East, of the coloured people, of the Moslem and the Pagan, of Asia and Africa? Roughly speaking, it was mechanical invention and the industrial revolution. The wars of the last half of the Eighteenth Century had a great effect. They showed how easily troops with western arms could beat those without. And by the end of the Nineteenth it is taken for granted that white troops with artillery and machine guns can deal with ten times their number of coloured troops who have not had access to the arsenals of the West. That is obvious ; but I think it would probably be true to conjecture that an economic change had also taken place as powerful in its effect as the change in military efficiency. Certainly in the eighteenth century and earlier it was a common experience for Western imaginations to be dazzled by the riches of the East. And we know how the first generation or two of Nabobs, heavy with the spoils of the pagoda tree, upset the course of politics in England. Whereas at present it is the English or American traveller who dazzles the eastern peoples with his rich apparatus and his power of drawing cheques. The wealth which imposes upon the imagination is not in the east, but as far west as London or even as New York or Chicago. This change of proportion has been brought about chiefly by a process of adding to one side while leaving the other alone. But there has been also a definite depression of the trade of the East. We hear little of it, for obvious reasons. But here and there we find small pieces of evidence. Dr. E. D. Clarke, a Scotch physician, who published his travels in the Near East in 1801, mentions his visit to a large village called Ampelaki on Mount Olympus, which was a centre for the making and dyeing of Turkey Red. It used to do a thriving trade with Central Europe, but when he passed through business had almost ceased. The local handworkers had been hopelessly undercut by the machines of Lancashire. There must have been a very widespread impoverishment of the non-European centres of culture from causes of this sort.

The White Man of the late nineteenth century had reached, except in a few places, a position of absolutely towering superiority over the coloured man. A white man with a machine gun or a bombing aeroplane cannot be expected to take quite seriously the most strong and skilful swordsman of Asia, so long as he has nothing but his sword. And a member of a big English or American firm, with vast credits at his command, cannot help smiling at dignified eastern or African elders whose whole fortune would not buy the contents of the smallest suit-case which he takes for week ends. And he feels justified in his consciousness of superiority, because after all the people are not Christians, and have no bathrooms or trains.

It is no longer a case of fighting ; not of hard fighting nor yet of easy fighting. It is a case of eating. It sometimes seems as if the West, like some enormous Saurian, some alligator of antediluvian magnitude, had slowly gazed upon the coloured civilizations in various parts of Africa and the East, till its slow brain gradually rose to the conception that it was hungry and they were good to eat. Then the great masticators set to their work. Of course, in saying this I am leaving out of account a very important element in the intercourse of West and East, or of white man and coloured. I am leaving out the work of missionaries, the work of independent philanthropists, real ὑπουργὸι, and, most important of all, the work of good government servants. They have always checked and modified this process ; sometimes they have completely transformed it. I am thinking for the moment of the process as it would be if these influences of conscience and reason were not working, or as it has been in places where they were not brought into play.

§4. Now I realize that, as the President, even the very temporary and unworthy president, of a learned society, I ought at this point to say that I will not speculate about the future. But, unfortunately, that is just what I want to do. I cannot help doing it, and I must merely ask you to excuse me until you obtain a more prudent president. The question is which of these two contrary tendencies which I have described, both greatly strengthened by recent events, is going chiefly to prevail? The one is the economic exploitation of the helpless territories and nations by the strong ones, a process which has enormous historical impetus behind it and is at this particular moment stimulated by the exceptional economic hunger of the European world ; the other is that consciousness of the Earth as One Great City, and that acceptance of duty towards our fellow man which, if my opening observations were justified, may now be normally expected of a civilized and educated man. This latter conception is well on its way to be an integral part of British public opinion, though of course in particular people its intensity will vary with their power of imagination, and its geographical limits perhaps with their degree of knowledge. I have not the smallest doubt that for some time there will be an attempt to run the two together. The determined money-hunter, who forms such an immensely powerful element in modern civilization, knows very well how to gild with moral and religious phrases the projects that promise the largest dividends. But that attempt cannot last. The conflict is too sharp between the two principles. Indeed the lists are already set and the issue joined.

Out of that strange chaos of passions which possessed the world at the close of the Great War, producing at the same time and through the same human agents the blockade of the ex-enemy Powers in time of peace and the Covenant of the League of Nations, the most startling object which emerged was Article XXII. of the Covenant, the Article on Mandates. It reminds me of a phrase used by Byzantine bishops, in an excess of humility, to describe themselves as elevated to their Bishoprics, not by Divine Providence, but "by divine inadvertence." There must have been a good deal of inadvertence, I will not say in heaven, but perhaps on the earth and under the earth, when Article XXII. slipped through the Peace Conference. At a moment when the appetite of our great Saurian was whetted to the utmost, when the prey lay ready before it to be devoured, Article XXII. swept in like the Harpies, and seemed to snatch the food out of its jaws.

An agreement which might have been drawn up by the most whole-hearted idealists in Great Britain, which might have been drafted in Exeter Hall and corrected by the Aborigines Protection Society, which would not have had a ghost of a chance of passing into law in any British, French, German, Italian, or American Parliament, has been signed by the representatives of forty-two nations, and is part, we may almost say, of the statute law of the world. Of course it directly affects only the new territories transferred in consequence of the war. It will act on the other territories only by way of example. But in the new territories the idea of possession is definitely abolished and that of trusteeship substituted ; the well-being and even the development of the native races is recognised as a "sacred trust for civilization." The Mandatory is debarred from making personal gain out of his trust. Not only the slave trade, but even the arms traffic and the liquor traffic are forbidden ; the military training of the natives, except for local police purposes, is forbidden. And, by another clause, even the trade and commerce of the territories must be open on equal terms to all members of the League, which will probably include, if not the whole world, at least the principal trade rivals of the Mandatory. And, to clinch the matter, an annual report must be sent in to the League of Nations to show how each Mandatory is carrying out his trust, and submitted to the scrutiny of a special Mandates Committee of the League.

Will this wonderful Article be sincerely and honestly carried out by all the Mandatory Powers? Of course not. The interested parties will exercise overpowering pressure to prevent anything of the sort. As a matter of fact, the Great Powers, while remaining firmly in military possession of the territories, have spent the last two years in refusing to accept any draft Mandates proposed to them. The League, disheartened, at last asked them to draw up their own Mandates and submit them to it for approval. This also they refused. And the League eventually asked them to draw up their own Mandates and act upon them, without submitting them to anybody, subject only to the Annual Report. This they accepted, but did not carry out. By the time the Assembly met, no draft mandates were ready. Then came an unanswerable protest from America ; a protest equally unanswerable from Germany ; an indignant series of letters from the Mandates Sub-Committee of the Assembly. And eventually Great Britain has produced two Mandates, for Palestine and Mesopotamia, and France one, for Syria . . . . which were laid before the Committee with the express stipulation that no public comment should be made upon them! Evidently they are not documents of which their authors are proud. The public will know all about them in time. And then the fight will come.

The interesting point of the situation is that the protest on behalf of the natives is no longer left to small and unpopular bodies, chiefly in England, consisting of a few missionaries and Quakers and ex-officials and stray philanthropists. It is definitely taken up by the Assembly of the League, which has not only spoken a severe censure on the conduct of the Great Powers, but has laid down unanimously two principles which the Powers were and are specially seeking to evade: that no Mandatory may use its position to acquire monopolies and special economic advantages, and that no Mandatory may increase its own military strength by means of its mandated populations. The reports have to be sent in to the League before next September.

There are the lists set. There is the fight that is coming; and I hope it will be a handsome one. I once in Australia lived in the house of a man who kept a bulldog, and who received a present of a small native bear. I was present at the scene of their introduction to one another. The owner explained carefully that they must be friends. He stroked them together, he gave them food together, he took them together for exercise in the garden. And all went well. The bulldog had a high sense of obedience and duty. But at the end, when it retired to its basket, it gazed miserably and long at the bear, with tears running in streams down its cheeks. It was so very hard not to kill him and eat him. That is how our Saurian will feel if the better elements in the Great Powers, backed by all the disinterested opinion in the rest of the world, succeed ultimately in imposing their will, like a bond of conscience, on the forces of uncontrolled and irresponsible covetousness which otherwise will plunder the world.

§5. For the Geographer the interesting point is that not merely are the Great Powers, by means of their increased geographical discoveries, able to make, and indeed forced to make, decisions about the whole Orbis Terrarum. The Orbis Terrarum itself is meeting in committee, and has enough mutual knowledge among its parts to be able to make at least a beginning of deciding about its own future. It is not merely that you and I can, in contemplation, survey the world from China to Peru. China and Peru are both members of the Assembly of the League, and have shown themselves useful members.

There is a motive for which I do not know the exact psychological name—let us call it professional interest—which is very powerful in human affairs. It is the motive which makes a man or a committee interested in the success of the job at which they are working. If once a man becomes a detective, he will be eager to track down law-breakers. He may start with no ill-will whatever against the particular breach of the law concerned, or indeed against any breach of the law, but he will soon be working keenly at his chase. It is a common experience in municipal and other bodies, that a man who is dangerously energetic in spending money if he is on a spending committee, will often be a ferocious economizer if he is put in charge of the accounts. If I remember rightly, there is a letter of Sir Robert Peel describing what anguish it was to him to see badly managed a department which he had organised, or knew how to organise, well. Now, I venture to say, that no one can read the debates in the recent Assembly of the League at Geneva without realizing that we have there—for the first time in history—a representative assembly of able men drawn from all quarters of the globe united by a professional interest in the welfare, concord, and wise guidance of the world as a whole. Some few individuals may have seemed to have a subcurrent of national feeling which they never forget; but for the most part, the persons speaking about typhus, or the arms traffic, or the traffic in women and children, or the prevention of various wars, really had their minds devoted to the thing they were talking about. They were really thinking internationally. They were genuinely interested in the public good of the world. And this, not because they were all more high-minded men than are normally elected to national parliaments ; but because the common good of the world was the business on which they were employed, and had set up in them the normal stimulus of professional interest. The same phenomena can be detected, though not in such glaring colours, in the ordinary work of the Secretariate. We have there, set up in the heart of Europe, a large body of able men, drawn from all nations, but united by the fascination of a common cause and a common professional interest, which is the securing of co-operation between the nations and the maintenance not only of peace but of good will.

All causes which depend for their success on the continuous operation of lofty motives are foredoomed to failure. Good government consists largely in so arranging matters that the great serried masses of ordinary everyday motives reinforce the good ones. In a well-governed society a certain decent level of social behaviour is generally maintained because things are deliberately so arranged that it is easier to maintain it than not, except when the pressure of passion or temptation to the square inch is unusually great.

Now if the future treatment of Africa and the East were merely dependent on a struggle between two forces, the desire of the exploiter to exploit and the desire of disinterested third parties, on ideal grounds, that he should not do so, the outlook would not be doubtful. The first is full blooded and intense passion, and the second a pale and ineffective one. But the struggle is not going to be so simple as that. Political and moral contests are not to be worked out as a mere parallelogram of forces. Or if they are, we must allow for such an infinite number of forces, pushing, pulling, inhibiting, suggesting, appealing to so many different elements in human nature, that the parallelogram becomes too complicated to construct. Now it seems to me that, under its present constitution, the League has succeeded to a remarkable degree in mobilizing for the cause of justice and good government a very strong phalanx of ordinary work-a-day motives, of the kind that rule an ordinary man in daily life. It has its secretariate permanently sitting and professionally devoted to the cause in question. It has the Assembly, which is led by every motive of professional interest and *amour propre,* to see that it is not made a fool of, and that the principles of the Covenant, of which it is the supreme guardian, are carried out. And many a government which has hitherto been worried by strong private interests into conniving, against its better instincts, in various methods of semi-slavery or expropriation or industrial exploitation of its subject peoples, will in future find itself turned in the opposite direction by the still greater and more searching worry of having to explain under cross-examination before the eyes of an unsympathetic commission representing fifty nations why it has omitted to perform various duties to which it was pledged, and why it has done various discreditable things which it had solemnly promised not to do. The world has not yet sounded or measured the immense power of mere publicity. I do not mean advertisement in newspapers; I mean the mere knowledge that your actions are to be known and discussed, and particularly that you will have to answer questions about them face to face with your questioner. Publicity is the only real weapon which the League possesses, but if properly used it may well prove to be about the most powerful weapon that exists in human affairs.

On the whole I think it looks as if we were moving in the direction of realising upon the earth something like the One Great City of Gods and Men. It will have, like other cities, its bad citizens as well as its good. But with the progress of knowledge, assisted by certain special lessons which have been lately learned at considerable cost, I think it will become within a measurable time almost impossible for a decent and intelligent statesman to profess absolute indifference to the welfare or suffering of other parts of the human race. To prove the point, one need only read the report of the recent International Financial Conference summoned at Brussels by the League of Nations, in which a number of bankers and business men and financial experts from a large number of different nations lay down, for practical reasons, a theory of international duty and a scheme of international co-operation which, ten years ago, would have been thought extreme and almost fantastic in a club of radical idealists. I think we shall achieve some approach to the One Great City: that is, I think that some consciousness of ultimate solidarity among the peoples of the earth has really begun to penetrate the minds of ordinary practical politicians; and secondly, that a sense of moral duty of the strong and advanced nations to help the weak and backward, instead of being confined to disconnected groups of unimportant people in various countries, is now definitely and comprehensively recognised in a great public treaty, to which all the most interested governments have attached their signatures, and will be regularly supported and asserted by the greatest existing organ of international opinion.

Let us not look to force. Force is against us: and there is no sillier spectacle than the sight of the weak appealing to force against the strong. We have no force. We have only the power of putting facts and questions before the public opinion of the world. Then the world, that is to say, chiefly, the electorates of the great nations, will be able to say whether they wish their Governments to do justly or unjustly, to be world-plunderers or world-builders.

I have read in the last few days two documents. One was the Report of a Commission on the territory which used to be German New Guinea, and which is now mandated to the Australian Commonwealth. There were two reports; one signed by a majority of the commissioners, showing how the natives could be made to work, and the territory developed like an estate, and the profits all diverted to Australian firms; the other, signed by the Chairman, showing how very differently the colony must be administered if it was desired to fulfil the spirit of Article XXII. of the Covenant and the best traditions of Australian policy. I cannot guess which side will win. But at least the lists are set.

The other document was the Report of Committee 6 of the Assembly of the League, the Committee which deals with Mandates, its correspondence with the Council, and its remarks upon the conduct pursued hitherto by certain great Powers.

There, too, the lists are set. At present no doubt the forces of reaction are far the stronger; but they are uneasy and alarmed. They do not like dishonouring their signatures in public. They do not like the remarks of outsiders, such as Germany and America. They do not like the thought of facing the Assembly or any Commission which represents the Assembly's point of view with duties obviously unperformed and promises broken. Yet sooner or later the Assembly must be faced.

I make no prophesy about the issue. I do not even feel sure that on the particular point about which the first battle will rage the great exploiting Powers will certainly be in the wrong and the idealist critics in the right. But I do think we may expect to see, in a very few years, a political conflict of extraordinary interest and world-wide range, which will take the form of a lawyer's or politician's discussion as to the exact meaning and application of Articles VIII., XXII., and XXIII. of the Covenant, but will really raise the problem whether all mankind are to be citizens of the One Great City, or whether some are still animals *ferae naturae*, which may legitimately be hunted for their skins.

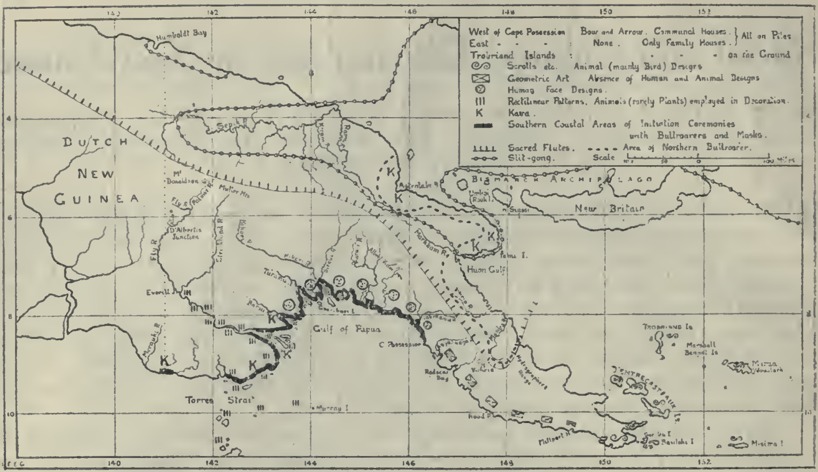
Racial and Cultural Distributions in New Guinea

Lecture given A. C. Haddon, M.A., Sc.D., F.R.S., to the Geographical Association, London, January 7th, and to the Liverpool Branch, January 11th, 1921.

THE outstanding feature of New Guinea is the great central range of mountains running north-west—south-east ; it consists of high peaks, plateaus, and subsidiary ranges, which are characterised by very steep slopes, covered with dense tropical jungle, thus travel is rendered very difficult and arduous. The interior is entirely unexplored, except along certain rivers. The two main river systems are those of the Fly, which flows roughly from north to south, and the Sepik (Kaiserin Augusta Fluss), which mainly has a west to east direction. The southern coastal area consists of swamps and an intricate series of deltas.

So far as our present knowledge is concerned we may regard the population as consisting of three main groups : (i) The Pygmies, very short, dark-skinned, woolly-haired, rather broad-headed folk, who in a mixed condition appear to be spread throughout the island, especially in the mountains ; the only relatively pure Pygmies that have been described are those of the Nassau range in Netherlands, New Guinea ; their language is unknown. (ii.) We confine the term Papuan to the congeries of peoples also inhabiting the interior and more especially the western part of New Guinea ; they have much the same general character as the Pygmies, but are taller and the nose is frequently curved—the " Jewish " nose, as so many travellers describe it. They speak a great variety of languages, all of which are classed as " Papuan." (iii.) In interrupted areas along the whole north-east coast and around the whole of the south-eastern peninsula, and extending in places some distance inland, are peoples speaking languages belonging to the great Austronesian family of languages. They evidently are mainly immigrants from Melanesia, and are hence termed Papuo-Melanesians. In the south-east they are characterised by a lighter skin, the hair is frizzly, curly or even wavy, and there is a marked tendency to broad-headedness, characters which scarcely appear on the north coast.

The lecturer mainly dealt with the southern half of New Guinea, and demonstrated various cultural distributions. A map of the distribution of houses shows that in the west the houses are mainly large communal dwellings, square in the interior and long in the deltas of the Fly, Bamu, Kikori (Aird), etc. ; in the Gulf district there are enormous ceremonial houses for the men and small dwelling houses ; from Cape Possession and throughout the whole south-east peninsula and the islands beyond the houses are family houses and there are no large ceremonial houses. All the foregoing are built on piles, but in the Trobriands and Woodlarks they are on the ground, which combined with other evidence points to a special migration from Melanesia to these islands. The use of the bow and arrow extends all over the west, but is absent throughout the south-eastern peninsula, except in the mountainous northern portion. Pottery-making is confined to the Papuo-Melanesians of the coastal areas, and is not made everywhere by these. There are two methods of making pots—(a) by modelling by means of the hand, a flat stone and a beating spatula, (b) by building up the pot in a spiral by means of a roll of clay. The two methods are never found in the same village, and it is evident that we have here to deal with distinct migrations of modellers and coilers. Coiled pottery is made up the Sepik and along its Keram affluent. A map of the distribution of the varieties of decorative art is very suggestive. In the extreme west we have usually simple patterns of straight lines, chevrons, etc., and isolated representations of


West of Cape Possession Bow and Arrow. Communal Houses. } All on Piles
East - - - : None. Only Family Houses. }
Trobriand Islands : - - - on the Ground
Scrolls etc. Animal (mainly Bird) Designs
Geometric Art Absence of Human and Animal Designs
Human Face Designs.
Rectilinear Patterns. Animals (rarely Plants) employed in Decoration.
K Kava.
Southern Coastal Areas of Initiation Ceremonies with Bullroarers and Masks.
Sacred Flutes. Area of Northern Bullroarer.
Slit-gong.
Scale
DUTCH NEW GUINEA
Humboldt Bay
Sepik R
Ramu R
Mt Donaldson
Fly R
D'Albertis Junction
Everill J
Kikori R
Turama R
Gulf of Papua
C Possession
Torres Strait
Murray I
Astrolabe B
Umboi (Rook I)
Siassi
BISMARCK ARCHIPELAGO
New Britain
Huon Gulf
Tami I
Redscar Bay
Hood P
Mullport H
Trobriand Is
Marshall Bennett Is
Murua (Woodlark)
D'Entrecasteaux Is
Basilaki I
Misima I
140
142
144
146
148
150
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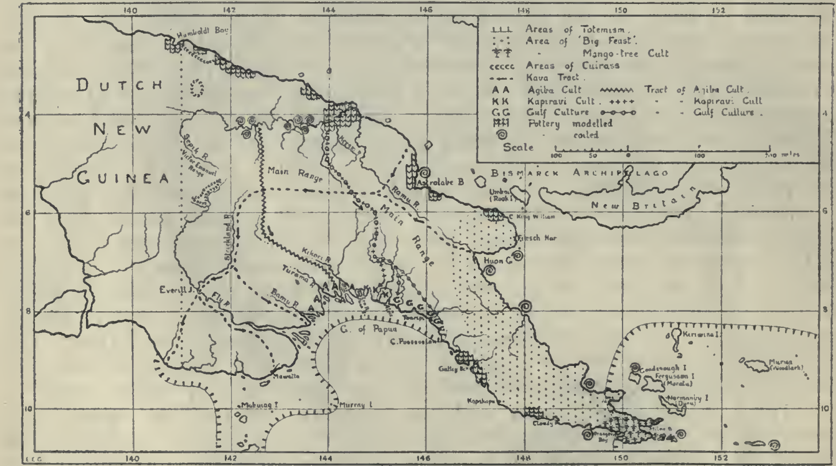
Areas of Totemism.
Area of 'Big Feast'.
- Mango-tree Cult
Areas of Cuirass
Kava Tract.
A A Agiba Cult Tract of Agiba Cult.
K K Kapiravi Cult. - - Kapiravi Cult
G G Gulf Culture - - Gulf Culture.
Pottery modelled
- coiled
Scale
100 50 0 100 200 miles
DUTCH NEW GUINEA
Humboldt Bay
Sepik R
Main Range
Strickland R
Everill J
Fly R
Bamu R
Turama R
Kikori R
G. of Papua
C. Possession
Mawatta
Mabuiag I
Murray I
Astrolabe B
Ramu R
Umboi (Rook I)
C King William
Finsch Har
Huon G
BISMARCK ARCHIPELAGO
New Britain
Galley R
Kapakapa
Cloudy
Milne B
Kiriwina I
Goodenough I
Fergusson I (Moratau)
Normanby I (Duau)
Murua (Woodlark)
140
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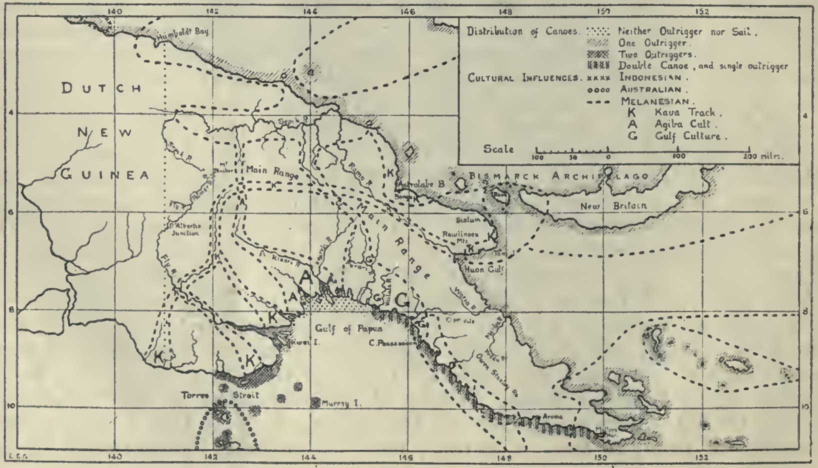
Distribution of Canoes. Neither Outrigger nor Sail.
One Outrigger.
Two Outriggers.
Double Canoe, and single outrigger
CULTURAL INFLUENCES. xxxx INDONESIAN.
oooo AUSTRALIAN.
MELANESIAN.
K Kava Track.
A Agiba Cult.
G Gulf Culture.
Scale
100 50 0 100 200 miles.
DUTCH NEW GUINEA
Humboldt Bay
Sepik R
Main Range
D'Albertis Junction
Fly R
Kikori R
Gulf of Papua
Kiwai I
C. Possession
Torres Strait
Murray I
Astrolabe B
Ramu R
Sialum
Rawlinson Mts
Huon Gulf
BISMARCK ARCHIPELAGO
New Britain
Aroma
140
142
144
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148
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152

animals. Along the coast of the Gulf of Papua the bulk of the patterns can be traced to human-face designs. From Cape Possession to Mailu the patterns are "geometrical," with a remarkable absence of curves and spirals and of human or animal forms; this is the area of the Western Papuo-Melanesians. The Eastern Papuo-Melanesians occupy the Massim area (the extreme south-east of the peninsula and all the archipelagoes beyond); their decorative art is characterised by circles, curves, interlocking spirals and the like, and the abundant employment of animal motives. The art reflects very clearly the socio-religious life of the people, which can be briefly described as totemic with little social cohesion in the west, an ancestor cult and apotheosised heroes in the Gulf, remarkably little religion in the intermediate region, and totemism with social cohesion in the Massim area.

It is quite evident that the ethnological problems of the south-eastern peninsula are different from those of central and western New Guinea. There were at least two main migrations from Melanesia to the former, the one coming in double-canoes and bringing a distinctive culture with it, including modelled pottery; the other comprised a highly artistic folk who made coiled pottery, and who have in New Guinea a remarkable cult of the mango tree.

Taking them as a whole the cultures of the Gulf and the west are characterised by a rich ceremonial life, elaborate initiation ceremonies at which bullroarers are swung, masks and other peraphernalia employed; there is a skull-cult, and the people are mostly head-hunters and cannibals. We have now to enquire what relations this general culture has with other regions of New Guinea. The south-eastern peninsula is clearly excluded.

The head-hunting, cannibalistic Tugeri who live at the mouth of the Merauke just within the Netherlands boundary have initiation ceremonies in which masks and the bullroarer are used, and during which the initiates are supposed to be swallowed by a monster who is bought off by presents of pigs and restores the youths to life. Kava is drunk only by initiated men. Precisely the same ritual complex is found among the Gogodara, between the Fly and the Bamu, and again in Huon Gulf and Astrolabe Bay on the north coast. The absence of any of the elements of this complex from the whole intermediate coastal area is almost conclusive against it having been brought to the west by a marine migration. The Tugeri have a stone-headed club surmounted by an elaborate wooden fretwork, which is similar to that of the Middle Fly area, and there are other points of resemblance. There seems to be but little doubt that the Tugeri migrated down the Strickland branch of the Fly and along the Merauke to the sea.

The culture of the Kerewa group of Goaribari island and the neighbouring mainland is characterised by long houses, an ancestor cult, and *agiba* shrines in the married men's houses. Attached to these shrines are numerous skulls of people who have been eaten, many of the skulls have painted clay faces and are variously ornamented. Plaitwork masks are made which have long noses, often downwardly curved at the end; similar masks have been recorded from the Bamu and Middle Fly.

The culture of the Namau people of the Purari delta is wonderfully rich. Near the end of the enormous ceremonial houses is a screen, and in the holy-of-holies beyond are eight or ten great basket-work monsters (*kopiravi*), through whose gaping mouths are thrust the bodies of victims, to be cooked and eaten the following day.

The culture of the Gulf (Elema) tribes further east is very similar, but the *kopiravi* cult is absent and the people are not cannibals. There is traditional evidence that all these Gulf peoples came from the upper waters of the Purari. So far, all the evidence points to a northern origin for these southern cultures, the main theoretical objection being the extremely difficult nature of the country to be traversed, but there is very good evidence that this has actually occurred.

Several cultures have been described for the Sepik. That of the Upper Sepik is widely spread and includes the Upper Fly. One culture of the Middle Sepik bears very close resemblances with those of the south coast. There are analogous large decorated ceremonial houses, on the front gable of which is a large human face ; inside are large numbers of skulls, usually with clay faces painted with scrolls and otherwise decorated in a manner similar to those from the south coast. There are numerous plaitwork masks practically indistinguishable from those of the Middle Fly, Bamu, and Kerewa cultures ; there are also carved bullroarers and other ceremonial objects, but unfortunately we do not know anything about the socio-religious ideas and customs of these interesting people. Finally, the canoes of the Central Sepik are precisely like those of the Kerewa folk. The obvious inference is that cultural influences have spread from north to south, probably by different routes at various times.

An analogous cultural movement is shewn by the distribution of the ratan cuirass. This strongly-made body-armour consists of a cylinder to protect the chest, with a front and a back projection from the upper rim. These occur on the north coast east of the Netherlands boundary, among the Krissi, some distance inland, and again in the Upper Fly district. A similar, but less rigid cuirass, was discovered by Wollaston among a Pygmy people of the Nassau range. Analogous body-armour is characteristic of the Kingsmill Islanders in Micronesia, whence the custom may have spread to a limited part of the north coast of New Guinea. It is inconceivable that the cuirass of the upper waters of the Fly could have travelled up that river, as nowhere else is this useful armour found, and it must surely occur somewhere in the eastern three-fourths of New Guinea if it had come by a sea migration. We may then safely conclude that cuirass-wearing people crossed the main range of New Guinea first east of the Netherlands boundary, and that the use of the cuirass was carried across very difficult country far to the west in Netherlands territory to the western slope of the main range.

To return to eastern New Guinea. The Koko, a Bush Orokaiva tribe who live in the valley of the Yodda (an affluent of the upper waters of the Mamba river), have important initiation ceremonies ; masks are not employed, but the bullroarer is swung (this being the most southerly point of its employment in initiation ceremonies), and also two long sacred flutes are blown. The use of pairs of long sacred flutes extends northerly along coastal tribes well into Netherlands territory. The distribution of these flutes coincides fairly well with that of slit-gongs ; these do not, however, extend south of Huon Gulf, but they are found some way up the Sepik. There is strong reason to believe that these two ceremonial objects are criteria of a cultural migration from northern Melanesia, but the cultural drift that brought these into New Guinea was entirely different from either of the two main migrations into the south-eastern peninsula.

The wonderfully rich complex of head-hunting, cannibalism, ceremonial houses, preserved skulls, elaborate initiation ceremonies with masks and bullroarers, extends, as we have seen, over a large part of New Guinea among " Papuan "-speaking peoples. This culture was not evolved by them, but was introduced from outside, possibly not all at one time, but this is another problem which cannot here be dealt with. What I have attempted to do has been to show that there are a large number of different cultures in New Guinea, some of which are inter-related, others being quite distinct. Modern ethnologists are now largely concerning themselves with such problems ; they are endeavouring to dissect out, as it were, the different cultures of an area and to trace the extensions of these culture layers elsewhere, and thereby to reconstruct unrecorded history.

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Students who require more detailed information are recommended to consult the following works by Dr. Haddon:—

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Evolution in Art, 1895.

"Studies in the Anthropogeography of British New Guinea," Geograph. Journ., XVI., 1900, pp. 265, 414.

"New Guinea," Encyclopedia of Religion and Ethics.

"Migrations of Cultures in British New Guinea." The Huxley Memorial Lecture for 1920. Royal Anthropological Institute. This is published separately, price 2s., and will be republished in the Journal of the R.A.I. It contains adequate references and five maps.

The Group Mind. W. McDougall, F.R.S. 304 pp. Camb. Univ. Press. 1920. 21/-.

Students of geography who are interested in the philosophical aspects of its humanistic side will find much in this book to stimulate thought. Its ability and suggestiveness are what may be expected, and its bias may be corrected by reading with it a book of contrary bias, "Community," by R. M. Maciver (London, 1917). To the latter it would seem that the community in its collective activity exhibits the resultants of the partly convergent and partly divergent activities of its members. For McDougall there exists a group mind, though he dissents from the idea of the State as a super-individual, a superhuman personality of the German idealists. He thinks, with Ernest Barker, that it is valuable to conceive of permanent groups as, in some ways, persons with a will and character and inheritance, and feels there is here something far above the mere contagion of passions and fancies that is associated with crowds. McDougall refers frequently to particular societies in particular places, and thus gives geographers matter for thought and at times for criticism. The author's knowledge of Borneo leads him to think of the "savage" born, living and dying in a small closed community, but one wishes that he had paid more attention to the ideas of Elliott Smith, Rivers. and others who have shown how much alteration occurs in process of time through contact between different communities. This would have led to the avoidance of the error of ascribing so much of the complexity of Australian native society to the mere intensification of the satisfaction of the group spirit. This is a factor in the case, but Haddon and others see in Australia the results of numbers of immigrations bringing in from without ideas which survive, often in a fantastic or degenerate form. No doubt the idea of "Migrations of Culture" is in danger of being overdone. Perhaps the best policy is to get back to the wisdom of Tylor himself rather than his commentators.

McDougall cannot always avoid the obsession of the State! He places Russia low in the scale of nations, rightly, and adds that it has remained for so long outside the area of European international life. The Russian State may have gone its own way in disastrous fashion, but the statement needs qualification in view of the immense influences of Russian thought for better and for worse on the rest of the world. The author's main plea here is that international intercourse is essential for national health, and all men of good-will agree to this. The danger of comparing groups as "forward" or "backward" is that it leads us too often to conceive of humanity as limping towards one goal, to imagine an evolutionary ladder up which we are all struggling. That concept makes too little of the rich diversity of opportunity which it is the geographer's privilege to emphasise. "The world is wide," even if the aeroplane seems to make it contract.

The book contains a fine tribute to the suggestive genius of Demolins. He quotes Demolins' famous chapter about the Norwegian fiords as productive of the Vikings and of endless results of their work the world over, but we still await a restatement of the matter. because the Vikings belong to a period and the work of the men of the fjords has changed strikingly with the centuries.

Dr. McDougall is to be thanked for a book which marks a distinct step forward in the attempt to improve our understanding of social man in relation to the earth.

Forms of Medieval Settlements in England.

By William Page

(Editor of the Victoria County Histories).

THOSE who have paid any attention to this subject must have experienced a need for some classification of the types of early settlements such as the Committee of the Congress of Archæological Societies, under the chairmanship of Lord Crawford, has provided for ancient earthworks and fortified inclosures. Although the question has received some little attention from French, German, and Scandinavian writers, the conclusions arrived at by them are contradictory and do not sufficiently apply to this country. Very little interest has hitherto been taken in the matter here. Prof. Maitland, following Meitzen and others, has adopted two main types, namely, scattered or dispersed settlements and those that are nucleated or clustered ; but these are inadequate for any detailed investigation, and the latter at all events, requires many subdivisions.

As in the case of earthworks, it would be well perhaps to approach the matter of classification of settlements from the point of view of plans and positions, leaving chronological, racial and similar questions, as far as possible, for later consideration. Such a classification cannot be laid down by one man, for no one probably has a sufficiently intimate knowledge of the whole country to make it. The following remarks regarding the more obvious types may, however, be an incentive to those interested in the subject to give it further study.

Scattered or Dispersed Settlements. These are to be found chiefly in the West and North of England and in Wales, though traces of them may be discovered elsewhere. In their original form they are necessarily agricultural or pastoral, and consist of single houses or groups of two or three lying dispersed over a wide area. They must not be confused with the hamletted districts that are the result of subinfeudations of the twelfth and thirteenth centuries, which, though not confined to what were waste lands, forest and marsh, are frequently to be found there. It is probable that the townships into which parishes in the North of England are divided had their origin in this class of settlement, and a careful examination of the subject will no doubt show many unexpected survivals and varieties of types elsewhere.

Nucleated Settlements off Lines of Communication. This class is to be found over all the eastern, southern and midland counties of England. In their original forms these settlements were the homes of an agricultural people, who selected the sites and laid them out purely with regard to agricultural convenience. The position was necessarily governed, as in the case of all settlements, by the presence of water or a water-bearing stratum. The village, which accommodated a self-contained community, was placed on high land at a convenient distance anything from a quarter of a mile to a mile off a road or river, and usually overlooked its territories which sloped away from it. Such a position gave a certain amount of protection from raiders and evil-disposed persons passing along the adjoining highway, and placed the villagers in the midst of their cultivated lands. The lord's residence, subsequently the manor house, was built on the highest part of the village, and when in the tenth and eleventh centuries the manorial system of chuch organization was adopted, the church was built usually by the lord adjoining his dwelling house. An excellent and almost untouched example of this type of settlement is to be found at Bygrave in Hertfordshire. Here the village lies in the midst of its territories off the Ermine Street on the west and the Icknield Way, forming the parish boundary on the south east. The site of the manor house, now destroyed, and the church lie together, surrounded by a moat, on the highest part of the village, while the houses of the villagers stand on either side of the little village street to the west. Immediately around the village are the inclosed pasture lands, and beyond them to the parish boundaries are the open arable fields of nearly 1,000 acres without hedge or fence. Across these fields run the uninclosed roads or driftways connecting the village with the main high roads. The river Ivel supplies the water power for driving the manorial mill ; a marl-pit gives marl for the lands ; a copse produces fuel and timber, and a coney warren provided rabbits and other game. Other examples of this class of settlement are to be found along most of the Roman roads, and are particularly noticeable on the Roman road running north and south through Lincolnshire.

Roadside Villages. In a large number of instances in the eastern and midland districts, these are merely migrations from the nucleated settlements to the highway in order to obtain the profits which the traffic of the roads afforded. Hence we often find a church and manor house, with perhaps a parsonage and one or two cottages, standing isolated far from the main village or town which lies along the high road. Sometimes the two villages are distinguished by the additions of Church Town and Street Town, Great and Little, North, South, East and West, Upper and Nether and the like, although such additions do not necessarily imply settlements of this nature. On the other hand the roadside settlement frequently takes an entirely different name from that of the parish. Redbourn in Hertfordshire is an example of this development. The church and a few cottages lying a little way to the west of Watling Street are known as Church Town, and form the early nucleated settlement off the highway. The principal part of the village has migrated to the Roman road and is called Redbourn, Street Town. Another and more developed instance is Stevenage, where the old Church of St. Nicholas, the Bury or ancient manor house, and one or two cottages, lie isolated to the east of the Great North Road, while the flourishing roadside settlement which bears the name of Stevenage and became a market town in 1281, is half a mile or more away on the high road.

The Ring Fence Settlement. This is usually associated with land which is or has been forest. An open or inclosed area, which in some instances has been cut up and built upon, but in others still remains as a village green or common, is encircled by a road which is continued on the opposite sides of it. The village is formed either round the incircling road or on part of it and on its continuation. The whole represents a clearing in the forest. Many examples of this class are to be found in Middlesex and in the forest lands of Kent, Surrey, Sussex and Hampshire.

The Smaller Market Towns. These were a development of the roadside settlement, for a market town must necessarily be upon a highway. They were established at ' places of nodality ' at the intersection or uniting of two or more roads or a way over some obstruction upon which roads converge, such as a ford, bridge or defile, or for the supply of a population brought together by the needs of a monastery, castle or industry. In most cases the market place, upon which the whole of the settlement depends, is laid out in the shape of an elongated V by the widening of the road at one end, but a rectangular or other shape is occasionally adopted. The land around the market place was divided into plots or *placeae* with narrow frontages on to the market or street, and long strips of land for gardens and orchards running back to a line which was adopted as the borough or town boundary. These plots were granted out by the lord of the soil to prospective tenants who gave an undertaking to build a house fronting on the market place, within a limited time. St. Albans, where the plan laid out by Abbot Walsin about 950 still survives, may be given as a good example of a town of this type. The market place is formed by widening the road to Wheathampstead immediately to the north of the abbey precincts, so that it tapers northward towards St. Peter's Church. The abbot as lord of the soil divided the frontage to the market place in the usual way, each plot having a depth going back to the borough boundary, which was later defined by a boundary ditch called Tonman's Dyke that may have been defensible. He encouraged settlers by making grants of timber and material for building the houses. At each of the three entrances to the town churches were built, St. Stephen's on the road from London, St. Michael's on that from the midlands, and St. Peter's on that from the north and east. This is a feature which occurs in many towns. All three roads met in the market place, so that the traffic by them was compelled in early times to pass through the town. The market place was at first supplied with booths and stalls which were only of a temporary character, but gradually they became permanent structures and eventually shops and houses. In this way all the southern or most important part of the market place has become built upon, and we have the network of courts and alleys which now occupy the space. Encroachments such as these are to be found in almost all market places of this nature, the most common form being an island row of houses with a lane behind, often called Back Lane.

Towns with Bridge-heads and Double Towns. Many towns standing on the banks of rivers at a bridge, ford or ferry have a bridge-head on the opposite side for the purpose of protecting the crossing and for the enforcement of the payment of tolls. Thus at Bishop's Stortford and Sawbridgeworth, where the county and parish boundaries generally follow the mid stream of the River Stort, they project at the crossing of the river by a salient or tongue of land into the eastern or Essex side of the river.

The double towns, one on each side of a river, such as formerly existed at the towns of Bedford, Buckingham, Hertford, Stamford, and elsewhere, were founded early in the tenth century by Edward the Elder and Ethelfleda, lady of the Mercians. They were of a similar nature to the towns with bridge-heads, but the bridge-head was formed into a town with a separate market place and organization. Most of these double towns were, however, merged into one at an early date.

The Larger Towns and Cities. It is generally recognised that all the larger towns which were laid out at one time are rectilinear in plan and take the form of a gridiron, and those which have grown up gradually have attained a concentric or spider's web plan. Most of our ancient cities have usually been established on the sites and within the walls of those Roman towns which had good water communication, the towns which had not this qualification like Silchester and Verulamium being left deserted. The entrances to these Roman towns were usually restricted to four gateways, so that the new settlers could not do otherwise than adopt approximately the lines of the ancient main streets crossing one another about the middle of the town, but the other lines of Roman streets were seldom revived. Thus the town was divided into four quarters, with the market place usually at the crossing. In a royal and episcopal city, the King's residence was in one quarter with the cathedral and bishop's house adjoining it. Such an arrangement seems to be traceable at Canterbury, York, Winchester, and elsewhere, and at many continental cities.

Bastide Towns. These towns had their origin in France during the thirteenth century, and were introduced into this country by Edward I., who established them in North Wales (Flint, Conway, Carnarvon, Beaumaris, etc.), and at Kingston upon Hull and Winchelsea. Towns of this type followed the rectilinear plan adopted for all towns laid out at one time. They were of various shapes and were walled. The market place was usually in the middle.

The foregoing are some of the more common types of settlements, but further study of the subject would no doubt yield many more varieties. Organized investigations would throw considerable light upon the archæological, ethnographical, and early economical development of the country in a direction which has hitherto received little attention.

Readers interested in the above article are recommended to refer to:—Haverfield, "Ancient Town Planning"; Tout, "Mediæval Town Planning"; also to the following articles:—Dr. E. J. Russell, "Regional Factors in Agriculture" in the "Geographical Teacher," No. 56, and one by Dr. H. J. Fleure in "The American Geographical Review," Vol. X., Dec., 1920, No. 6.

Economic Geography of the Mersey Estuary.

MR. LLEWELYN RODWELL JONES sent in an article for this magazine in 1919 on the Economic Geography of the Mersey Estuary, but owing to difficulties of publication and the need for keeping the size of the magazine within bounds, the article had to be held over. Mr Rodwell Jones is now proposing to amplify his work and to issue it in book form, so it would obviously be unwise for us to forestall his book by publishing the article as it was sent in. We wish to draw attention to the value and interest of his line of thought about Liverpool.

He has made the distinction between estuarine ports at the lowest bridging like London, Gloucester, and Preston, and lower estuarine ports growing along lateral creeks like Hull and Liverpool. The former had great advantages in the days before docks and huge ships, and especially before railways, because they gave deeper ingress into the country, but the lower creek-port came into its own in the 19th century. Hull still uses its old creek, but has spread along the river; Liverpool creek is filled in and she depends on the river alone. He makes a special study of Liverpool's slave trade as part of a triangular scheme, slaves from West Africa especially to the West Indies and North America, sugar, rum, tobacco, timber, fish, skins, and increasingly cotton from the latter to Liverpool, and finally cheap muskets, ornaments and textiles from Liverpool to West Africa. The dominance of the cotton trade has increased remarkably in the 19th century.

Manchester at the back of the Port of Liverpool, and separated from it by a fateful 36 miles, is studied specially by Mr Rodwell Jones. The connections between the two are an epitome of the history of communications; packhorse, small canal, railway, ship canal, have all had their influence here, and there are few places in the Old World at the present day with as good intercommunication. The importance of commercial inertia in the sharing of work between Manchester and Liverpool is a very vital matter, and Manchester is, up to the present, the more specialised port, though the free spaces available at Trafford Park have brought to the latter a great deal of the timber trade once done at Liverpool. Manchester's imports are mainly cotton, timber, wheat and oil.

A further most interesting field of study worked out by Mr Rodwell Jones is that of industrial developments based upon the free space along the Ship Canal and the other canal, as well as that of industrial growth dependent upon easy carriage of salt from the Weaver basin to the South Lancashire industrial area.

Teachers who follow out these ideas will find it convenient to think of Warrington as the original port at the lowest bridging, and to note how, with the growth of Liverpool, the importance of Warrington's bridge has eclipsed that of its port.

Ordnance Survey and Map Issues. III.

THERE are no new types of Ordnance Survey maps to announce since the publication of the last article (Summer No. 1920, p. 210), but an important development of Ordnance Survey methods is the decision to adopt the device of emphasizing certain contours (every 5th 50ft. contour) for issues of the one inch map of the whole of Great Britain north of a line which includes the Lake District, and also for the Isle of Man. A proof impression of the contour sheet of the Isle of Man (recently resurveyed) which has been kindly supplied by the Director-General served as an excellent illustration of the value of this emphasis. There is practically no terraced effect, and the rapid reading of contours is much facilitated. Incidentally the small contour interval gives a striking relief effect practically equal to that produced by the most carefully drawn hachures and one which is, of course, much more accurate.

Continued progress has been made in the issue of the New Series ¼ inch and 1 inch Popular Edition Maps which were described last year. Of the contoured and layer tinted ¼ inch maps, 9 of the 12 sheets for South Britain, i.e., Nos. 4 to 12 inclusive, will be available by the end of January, 1921. These comprise all of England and Wales south of the line Grimsby to Southport. Sheet No. 3 (largely Yorkshire) to slightly north of Stockton-on-Tees and West of Settle will be ready by the end of February, 1921, and Sheet No. 2 lying West of Sheet No. 3 and comprising North Lancashire, Isle of Man, etc., will be ready by the end of the following month.

Only seven extra sheets of the 1 inch Popular has been issued since the last article was published, but several of them are of importance. Staines sheet completes Surrey, Tunbridge Wells completes Sussex, and the four new sheets to the east of the original line complete Kent ; in addition the new Rugby sheet takes the map into S. Leicestershire. The boundaries of the area to be ready by the end of January, 1921, are approximately Newtown (Mont)—Church Stretton—Ludlow—Tenbury—Warwick—Hinckley—Attleborough—Eye—Newmarket—Dartford—N. Foreland—Dungeness—Ventnor—Start Point—Land's End—Ilfracombe—Watchet—Barry—Newtown (Mont). This represents 60 sheets out of the 146 for the complete map.

The descriptive pamphlet of the Ordnance Survey Small Scale Maps which was so strongly recommended to teachers in the Spring No., 1920, of the GEOGRAPHICAL TEACHER (p. 155), has been republished, and the second edition is a larger book and is on sale at sixpence. In addition to the valuable features already described, there is a new index (New Series ¼ inch) and some new maps. The quarter inch shaded old series sample has been replaced by part of a Scottish sheet which includes the greater part of Nithsdale, and there is ample material on the new sample for numerous exercises. The second edition sample of the 1 inch Popular is a piece of the Abergavenny sheet, and is much more satisfactory than the old Appledore fragment in indicating the excellence of this particular series. The other samples remain as in the first edition. There are also two additional maps, a sample of the quarter inch layer tint comprising Plymouth and Launceston, and a sample of the 1 inch Tourist District Map showing part of Derwentwater and Skiddaw Forest. As each of the ten samples is about 5½ inches by 6 inches, the value of the pamphlet is obvious. It is the cheapest method of buying maps of other areas and in other styles for comparison with the home area.

Another recent publication to which special reference should be made is the new companion pamphlet on Large Scale Maps. As all teachers are strongly recommended to get a stock of these, it will be sufficient to give a brief account of the chief contents. The pamphlet is issued at sixpence, and should be on general sale when this number of the "Geographical Teacher" reaches its readers.

The introduction, historical details and facts about the revision of the large scale maps, are very interesting features. Two short extracts are quoted: "Six inch maps exist for the whole of Great Britain—every acre of it, and the number of maps is 913 full sheets, together with 14,894 quarter sheets (18in. x 12in.). The number of 25in. sheets is 51,456—the whole surface except waste and mountainous regions having been mapped on this scale." "A 25in. map shows objects the same size as would be indicated in a photograph taken at 2,500 feet above the ground with a camera having a lens of 12 inches focal length; for the 6 inch map the corresponding height would be two miles." In the pamphlet there are 14 plates in all, two of them being large forty-inch folders giving full details of the conventional signs and writing of the 6 inch and 25 inch maps. The other plates consist of generous samples of 6 inch, 25 inch, and 50 inch maps, including a portion of the recently completed revised town plan of Southampton. This is on a 6 inch scale and is fully coloured. So far Southampton and Leicester have been published in this series. Others in course of preparation are Cambridge, Hull, Lincoln, Nottingham, Wolverhampton, and York. Each town plan, fully coloured, mounted on linen and folded in cases, will be on sale at 4s. Other plates show revision periods for maps; diagrams of scales; portion of index; meridians on which large scale maps are drawn. In connection with this last item several interesting points suggest themselves from the plates. Three separate meridians are used for Wales, Monmouth and Salop, 16 others for the remainder of S. Britain, and 19 are used for Scotland. West Yorkshire and East Lincolnshire have some sheets more than 60 miles from the central meridian of the area, while Scotland's sheets, excluding Roxburgh on the Lanark Church spire meridian, are situated much nearer to the central meridian than many of the S. Britain sheets.

WALLACE E. WHITEHOUSE.

Deputation to Sir Theodore Morison in reference to the establishment of a School of Geography at Armstrong College.

1. On lines similar to Oxford, Cambridge, Liverpool, Leeds, Manchester, London School of Economics, etc.
2. Newcastle a most desirable centre—world-wide trade; large number of Training College students; no centre nearer than Leeds (100 miles).
   Geography of Advanced Courses not to prove a cul-de-sac.
   Cost of equipment small.
   Importance of Geography emphasized by the Board of Education in their setting up a new National Geography Committee.
   Geography to count as one subject for a Pass degree or as principal subject for an Honours degree, or as research subject for a post-graduate Ph.D.
3. Need of a Teachers' Diploma in Geography for graduates and other qualified persons engaged in teaching.
   To be taken either in Day or Evening Courses (similar to Diploma in Commerce).
   Suggest six papers—one of which shall be a thesis and one a compulsory practical examination.
   Attendance required: either three nights for two sessions or two nights for three sessions.
   One of the optional papers (2) shall be on "The Teaching of Geography."
   The compulsory papers shall be—(a) Regional and General Geography, (b) Special Region; making with Thesis and Practical four compulsories out of six papers.

The Iron Industry of South Wales.

By A. E. Trueman, D.Sc., F.G.S., University College of Swansea.

THE iron industry of South Wales has a long and interesting history, and it has had a remarkable influence on the other industries of the area. Indeed, the economic development of South Wales was largely due, in the first place, to its iron trade, and not to its coal trade. The localisation of the iron industry and its subsequent development have been controlled by the physical and geological structure of the coalfield.

STRUCTURE OF SOUTH WALES.

The South Wales coalfield is a downfold or syncline, wider in the east, in Monmouthshire, than at the western end, in Pembroke (fig. 1). The syncline includes several minor folds which have the effect of keeping the worked coal measures comparatively near the surface. On the south of the coalfield the rocks dip more steeply than on the north, and, therefore, the coal-bearing rocks occupy a wider belt of country on the north than on the south; this steeper dip makes mining more difficult along the southern outcrop (fig. 2).

The Coal Measures of South Wales differ from those of most other coalfields because they include a massive series of sandstones, the Pennant Sandstone, often several thousands of feet in thickness. As a consequence, the coalfield district is a plateau, reaching from 1,000 to 1,800 feet in height, trenched by narrow, steep-sided valleys, which determine the position of habitations and the lines of communication. An excellent and readable account of these features and their influence on the distribution of population is given in a recent report on Industrial Unrest in South Wales.[1]

IRON ORES.

The iron ores found in South Wales are of two kinds, ironstone nodules and hæmatitic ores.

The hæmatite is found in masses in the carboniferous limestone near the south-eastern margin of the coalfield, particularly north of Cardiff. The quantity of this ore, comparatively, is not large, and local hæmatite working has not influenced the South Wales iron trade to any appreciable extent.

The ironstone nodules, on the other hand, are present in considerable quantity. They are found interbedded with the Coal Measure rocks in isolated balls and in layers only a few inches thick. The nodules are often low in iron content, and contain various impurities, notably sulphur and phosphorus, but the working of these nodules has largely determined the development of the South Wales iron trade.[2]

HISTORY OF THE INDUSTRY.

(i). *Early Days of Iron Working.*[3]

Iron ore was mined and smelted in South Wales in very early days, certainly in Roman times. Cinder heaps marking the positions of these old

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[1] "Report of Commission of Inquiry into Industrial Unrest" [cd. 8668, 1917]; see also A. E. Trueman, "Population Changes in . . . South Wales Coalfield," Geograph. Journ. (1919), p. 410.

A concise account of the geology of the area is given by Sir A. Strahan in "Geology in the Field" (Geol. Assoc. Jubilee Vol., 1910); see also the Memoirs of the Geological Survey dealing with the Coalfield, and an article by Prof. A. Hubert Cox in Proc. Geol. Assoc. (1920).

[2] For fuller particulars of the occurrence and distribution of these ores, see J. F. Tallis, Pres. Add. South Wales Inst. Min., Eng., XXXIV. (1918), and also Memoirs of the Geological Survey, Iron Ores, Vol. X. (1919) and Vol. XIII. (1920).

[3] See C. Wilkins, "The History of the Iron . . . Trades of Wales" (1903); John Lloyd, "The Early History of the South Wales Iron Works" (1906).

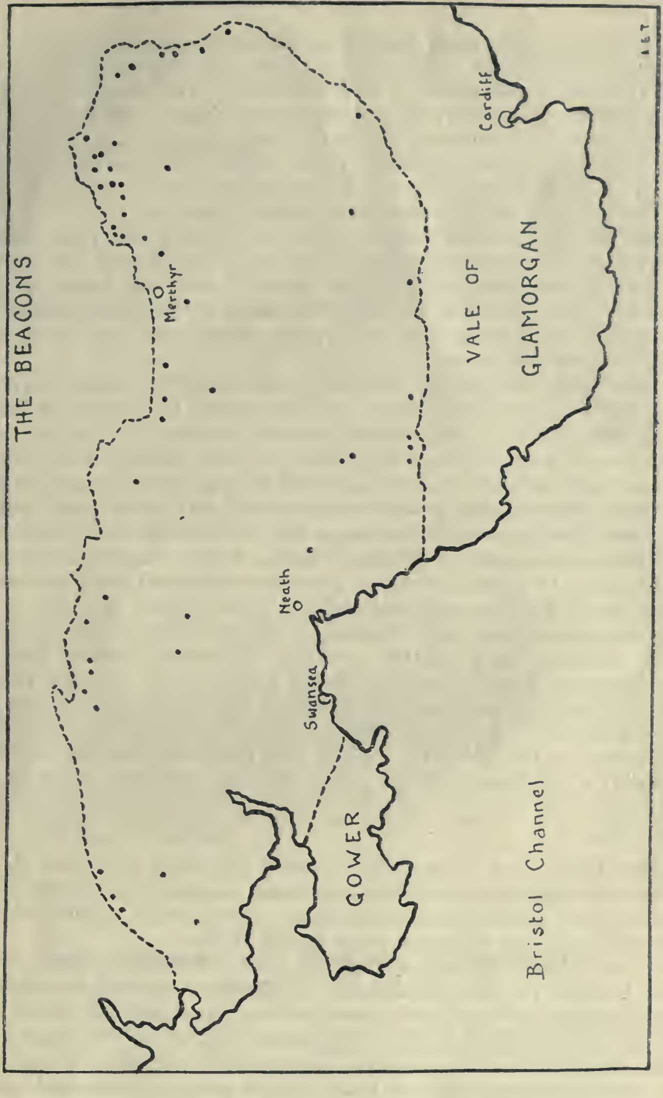

Figure 1: Map showing the principal localities where the ironstone nodules of the South Wales coal measures have been worked.

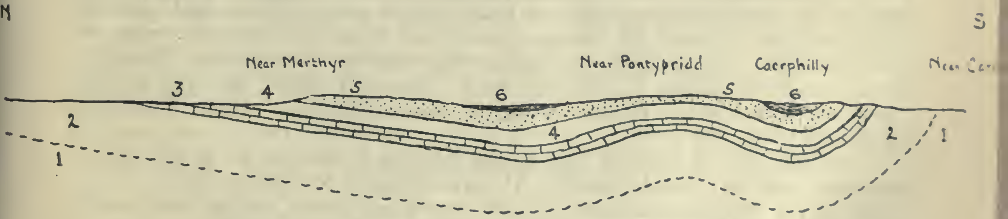

Figure 2: Section across the eastern end of the South Wales Coalfield (vertical scale exaggerated).

1 Silurian; 2, Old Red Sandstone; 3, Carboniferous Limestone and shales of the Millstone Grit; 4, Lower Coal Measures; 5, Pennant Sandstone; 6, Upper Coal Measures.

furnaces are to be found in many places in the eastern portion of the coalfield. Throughout the Middle Ages, and until towards the close of the 17th century, little progress was made in iron smelting. The smelting hearths, known as bloomeries, were built at any convenient place, often in the hills near the fuel supply. Numerous records of mining during these early centuries are in existence, while during Tudor times iron was manufactured at many places, including Aberdare and Merthyr Tydfil.

(ii). *Iron Trade during the 17th and early 18th Centuries.*

The South Wales iron trade began to develop during the 17th century. This was partly due to the immigration into South Wales of ironworkers from other districts, attracted partly by the abundant ore, but more especially by the forests which then covered the hills,[4] for some of the ironmasters came from the Wealden area, which, owing largely to the use of charcoal in smelting, had become deforested.

As the iron trade developed, smelting was done in small furnaces, generally not more than ten feet high, placed against the side of a hill for convenience in filling, and provided with a bellows worked by a water wheel.

The ore was at first obtained by picking up the nodules from beds of streams, where they had been washed out from the clays with which they are associated. Subsequently this process was carried out on a large scale by "scouring" the clay in the hillsides near the rivers, but finally it became necessary to resort to mining by levels, "slants," and shafts, and to hand-sorting of the ore. It is interesting to note that in those days it was not uncommon for the coal to be neglected entirely while mining the ore.

Early in the 18th century iron working in South Wales began to decline owing to the shortage of wood for making charcoal. Before this time experiments had been made in several places with a view to using coal for smelting, but it was not until about 1750 that the use of coal in smelting became at all general. This marked the commencement of the third stage in the development of the industry. From this time onwards the iron trade increased rapidly, for South Wales not only had ore but also coal in abundance.

(iii). *1750—1850.*

During the latter part of the 18th century and until well into the last century, iron working was the most important industry in South Wales. Coal was mined, but mainly for iron smelting; until about a hundred years ago scarcely any coal was exported from South Wales.

This period of rapid development of the iron industry was characterised also by a development of communication. In 1750 there were no roads along even the main valleys,[5] which were often marshy; the only means of transport were by ponies, waggons, or even wheelbarrows, along the rough tracks over the hills. Roads along these eastern valleys[6] were constructed and partly replaced by canals before 1800. A little later tramways were laid, and in their turn were replaced by railways, nearly all these early improvements in communication and transport facilities being undertaken in South Wales to develop the iron industry; the coal trade, and particularly the coal export trade, developed later, largely owing to the existence of these improved communications.

The iron industry during this period developed most of all in the north-east corner of the coalfield (see fig. 1). The reasons for this are:—

1. The ironstone nodules, the ores used principally during this period are richer in the east than in the west of this coalfield.

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[4] Most of the hills have long been devoid of trees, but many place names show the former existence of forests.

[5] The first road along the Taff Valley from Merthyr Tydfil to Cardiff was made in 1767.

[6] Some of the valleys west of Swansea are still without good roads.

2. The ores are more easily worked in the north than in the south, because of the gentle dip (fig. 2).

So during this time such iron centres as Merthyr developed rapidly.

(iv). *Recent Developments.*

A further change in the conditions affecting the South Wales iron industry took place near the middle of last century, when iron was being replaced by steel for many purposes. On account of certain impurities in the ironstone nodules, they were not suitable for steel manufacture by the old processes. The South Wales works, therefore, commenced to import ore, chiefly hæmatitic ore from Spain; and owing to the transport facilities which had been developed for the export of the iron, they were able to convey the ore easily to the works, so that the industry continued to flourish in the old centres in the north-east of the coalfield, notwithstanding that the conditions which originally gave rise to iron working there were completely altered, for the ironstone nodules are practically unworked in South Wales at present.[7]

While the iron industry is still important in the Merthyr and Pontypool districts, iron works are flourishing and are likely to be developed still further near the ports, with the resulting avoidance of transport up the valleys. This is particularly true of Llanelly, Swansea, and Neath, but also to a less extent of Cardiff.

The growth of the tin plate industry, and of many other metallurgical manufactures, has been closely connected with the expansion of the iron trade.

It is notable that most of the South Wales steel works continue to import foreign hæmatite, and that comparatively little of the Jurassic ironstone is brought into South Wales from the Midlands.

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[7] At present it is only in Staffordshire that these coal measure ores are worked to any appreciable extent; that is to say, only in that place is it true that iron and coal are now worked together.

The Groundwork of Modern Geography. By ALBERT WILMORE. Bell & Sons. xv. x 396 pp. 7½ in. x 5 in. 6/-.

Dr. Wilmore's book is one of the volumes in Bell's Geographical Series of which he is the editor, and it is intended as an introduction to such volumes as "Regions of the World" and Lyde's "Europe." Section by section it has been well thought out and has good bibliographical lists, numerous exercises, excellent illustrations, and a satisfactory glossary and index; but it is a debatable point whether a book of some 400 pages can claim to cover the groundwork of modern geography when it omits Cartography and Mathematical Geography (which the author himself quotes as being the base of geography) and only mentions Oceanography incidentally. The geological side is emphasised or over-emphasised. As is to be expected from Dr. Wilmore, this section is accurately written, but it should form a volume by itself. It claims nearly 200 pages and abounds in difficult technical terms, and the author himself evidently realises this, for 70 per cent. of the terms in the glossary relate to this section. There is an element of danger in placing such work before the average senior local pupil. Time table requirements alone would either cut out most of it or cause excessive memorisation. Section B. (45 pages) deals with climatic geography, and has a particularly good long chapter on types of climate, but Fig. 24 has some confusion in the shaded areas, and the omission of the 64 deg. F. July isotherm has seriously weakened the value of the map. Fig. 25 footnote should be modified and call attention to the difference between those isotherms North and those South of the 50 deg. F. isotherm. Section C., Biological Geography (110 pages), has some 70 pages of excellent material dealing with world's flora. The illustrations to this section are specially good, but they are on a high level all through this useful book. W.E.W.

Geography for Ceylon Schools

FOR STANDARDS II. TO IV.

By Miss Dorothy Loos, Mahabodhi College, Colombo.

STANDARD II.

Food Products and Occupations connected with them.

Subject Matter.—1. (A) *Paddy*. Cultivation of the grain. (a) Irrigation; (b) ploughing and preparation of the soil; (c) sowing and treatment of field in various stages of growth; (d) reaping; (e) threshing, winnowing, and pounding; (f) the storage of the grain; (g) stocking of imported rice; **other grains—kurakkan, gingely, maize, etc.**

Correlated Handwork.—Making of paddy field; cardboard models of plough and buffaloes; paper pulp models of Anuradhapura District and Tamankaduwa District; models of sickles in cardboard; paddy pounders can be easily made of small stumps of drum-stick (mooroonga), which allows convenient scooping of the hollows; cardboard winnows; model of bissa with rattan and plasticene; cardboard and paper models of double-bullock carts.

Subject Matter.—2. (B) *The Coconut*. (a) The cultivation of the coconut palm; (b) the chekku, the different methods of extracting oil from the kernel; (c) preparation of the kernel for export (1) copra, (2) dessicated nut; (d) different articles of general use manufactured from the husks and shells; (e) the preparation of the husks; (f) uses to which the leaves and trunks are put; (g) toddy drawing; (h) preparation of flour.

Correlated Handwork.—Cardboard model of " chekku " or oil mill; making of small ladles with " dhomba " shells to resemble coconut shells; making of small brooms with fibres and ekles.; making of ekle brooms.

Subject Matter.—3. (C) *The Palm of the North—The Palmyra*. (a) All about the fruit (uses and description); (b) the preparation of the flour from the seedlings (two methods); (c) the extraction of toddy; (d) manufacture of jaggery and sugar from the sweet toddy; (e) the uses of the leaves and trunks; other palms—kitul, arecanut, date.

Handwork.—Making of fans, baskets for drawing water, jaggery baskets; model of " thula," or apparatus for easy drawing of water from wells.

Subject Matter.—4. (D) *The Vegetable Gardens*. (a) Vegetables produced within a radius of 15 miles; (b) vegetables produced up-country. The School Garden—(a) preparation of soil and sowing of seeds; (b) the nursery; (c) the fruit store (fruit grown within a radius of 100 miles); (d) low-country and up-country fruits.

Handwork.—Work in the school garden; care of young seedlings, manuring, weeding, and watering; plasticene modelling of different kinds of fruits.

Subject Matter.—5. (E) *Fisheries*. Nature lessson on fish. (a) Kinds of fish caught in the Indian Ocean; (b) methods of catching; (c) the fishermen and their craft; (d) dangers.

Handwork.—Making of nets with twine or cotton thread; making ot rod and line; making of basket-shaped nets; model of boat with outrigger and sails.

Subject Matter.—6. (F) *The Meat Stall*. (a) The mart; (b) the different animals slaughtered for food and the different kinds of flesh; (c) the butcher and his stall

Handwork.—Model of meat stall, scales and weights; cardboard models of cattle and goats.

Subject Matter.—7. (G) *The Poulterer*. The method of raising poultry. (a) Egg production; (b) table birds.

Handwork.—Model of a hen coop; cardboard model of hen and chickens.

Subject Matter.—8. (H) *Turkeys, Geese and Ducks*.

Handwork.—Cardboard models of the birds.

Subject Matter.—9. (I) *The Grocery Stores and the Grocer.* (a) The variety of foreign products; (b) flour and making of bread (the bakery); (c) jams and jellies; (d) tinned meats and fish; (e) sugar and method of refining (different kinds of sugar); (f) butter and butter-making; (g) cheese and cheese-making; (h) milk (condensed); (i) cocoa and chocolate; biscuits (different makers).

Handwork.—Model of wood of grocery stores; making of an oven with small bricks; preparation of bread; cardboard model of churn.

Subject Matter.—10. (J) *The Curry Stuff Dealer.* (1) His store of stuff and from where obtained.

Handwork.—Making of bags to hold each kind of stuff; models of scales and weights.

STANDARD III.

BUILDING MATERIALS AND RELATED TRADES.

Subject Matter.—(A) (1) A natural forest (a) location; (2) the timber merchant; (3) the brickyard and kiln; (4) a stone quarry; (5) a furniture factory; (6) the lime kiln; (7) the carpenter's shop (a) tools used; (8) a blacksmith's shop; (9) the tinner—soldering, roofing, tinning, spouting; (10) the mason—tools used, (a) plastering, making of plaster, (b) lime and sand.

Handwork.—Making of bricks and kilns; making of kiln; making of one or more of the tools used by the carpenter, blacksmith, tinner, and mason. Copy teacher's collection of small tools.

Subject Matter.—(B) Excursion to a house in process of construction. (1) The foundation and floor plan; (2) drawing of ground plan; (3) framework—posts, joists, beams, studding, rafters, manner of setting in door frames and window casings; (4) water supply, drainage, connection with sewer; (5) painting, varnishing, tinting, decorating; (6) interior and exterior finish.

Several excursions at different times during the process of construction and completion should be made. Shops, quarries, and mills should be located. The children should be led to observe how closely each trade depends on another.

2.—CLOTHING MATERIALS USED—INDUSTRIES.

Subject Matter.—(A) Excursion to Spinning and Weaving Mills. (a) note machinery used—looms, yarn; (b) the spinning and weaving of cloth. Discussion on the simpler process of manufacture.

Handwork.—Weaving frames.

Subject Matter.—(B) *The Drapery Stores.* (a) Variety of goods sold, as cotton cloth, linen, silk, lace, woollens, and straw; (b) woollen cloths and their manufacture; (c) cotton fabrics and their manufacture; (d) silk and its manufacture; (e) hosiery; (f) local manufacture of hats and laces.

Handwork.—Collection of materials and folding up into bundles; making of small hats with plaited straw.

Subject Matter.—(C) *The Milliner.*

Subject Matter.—(D) *The Shoemaker.* Tools used. (a) Cattle and hides; (b) methods employed in tanning skins.

Subject Matter.—(E) *The Tailor.* Machines, cotton, hooks and eyes, needles and pins.

3.—LOCAL COMMERCE.

Subject Matter.—*Roads, Railroads, Bridges, etc.* (a) Discussion on the chief roads leading out of the town into the adjoining villages from the principal market places; (b) making of a rough map or model of the town in which the school is situated, with a few of the main streets and location of the market places.

Handwork.—Making of map or model by teacher and class.

Subject Matter.—*Example—Map of Colombo.* (a) Road and tramway leading to Grandpass and the surrounding villages; chief market places on the route (1) Mariakadde, (2) Municipal Market Pettah, (3) Grandpass Market; (b) roads leading to Kotte, Nugegoda, and surrounding villages; chief market places, Borella Market, Kotte Market; (c) road leading to sea-coast towns and villages; chief market place on route, Colpetty, Slave Island Markets; (d) road leading to Mutwal; markets, Municipal, in Sea Street.

Handwork.—Making of map; a market with provisions.

4.—COMMERCE ON A LARGER SCALE.

Subject Matter.—(A) *Chief Railroads* leading out of the town should be then marked on the map. Example—Colombo as junction., viz., Maradana or Central Station. Chief Railroads—(1) Sea coast line; (2) main line leading to Kandy and up country, Jaffna and Negombo; (3) the Kelani Valley line.

Handwork.—Model of Ceylon with railways.

Subject Matter.—(B) *Model of Ceylon.* Chief Railroads placed on model.

(C) District Stations and products conveyed by rail to Colombo.

Colombo District Stations: Kelaniya, Heneratgoda, Mirigama, Polgahawela, and Rambukkana. Products: Coconuts, paddy, vegetables, bricks, tiles, manures, pepper, cinnamon, rubber, tea, coconut products, plumbago, plantains, baskets, furniture.

Kalutara District Stations: Panadure, Kalutara, Bentota, and Alutgama. Products: Coconuts, arecanuts, plantains, cinnamon, tea, rubber, paddy, betel, pepper, arrack, vinegar, manufactured articles, tea chests, brass and silver work, coir rope and matting, agricultural implements, furniture, carriages, mangosteens, plumbago, basket and hat industry, coral and lime.

Galle District Stations: Kosgoda, Galle. Products: Coconuts, breadfruit, betel, pepper, cinnamon, jak, citronella, oil, rubber, copra (250 tons), cinnamon (100 tons), coir yarn (200 tons), plumbago (60 tons), arrack (40 tons), despatched by rail annually; manufactures, basket making, lace, silver and brass work, knives, carts, skilfully carved furniture, bricks, earthenware, copra, coconut oil, ekle and coir brooms, jewellery, tortoise-shell ornaments, lace, tea, paddy, betel and arecas.

Matara District Station: Matara. Products: Coconuts, paddy, betel, arecas, pepper, kurakkan, cinnamon, citronella, baskets, lace, jewellery, coir, and furniture.

Subject Matter.—(D) (1) Discussions on the methods of transport from railway station to mills and warehouses, viz., lorries, double-bullock carts and padda boats on canal; (2) location of chief roads on map of Colombo leading from station to chief mills and warehouses; (3) discussion on the transport of articles ready for export from the mills to the wharf and custom house; (4) location of jetty and harbour on map of Colombo.

Handwork.—Models of padda boats and bullock carts; model of jetty.

Subject Matter.—(E) *Local Surface Features.* Discussion of any stream or river near the town in which the school is situated, e.g., the Kelani River, near Colombo.

Handwork.—Model of a stream, with boats, etc.

FIRST STEPS TO GEOGRAPHY.

This is an attempt to outline and describe a complete course of study in Home Geography, and to show how to approach the wide field of Geography teaching in a rational, concrete, and interesting manner.

In bilingual and Anglo-vernacular schools, or colleges where the majority of boys in the lower school know no English, the lesson given below can take the form of conversation lessons; English can be learnt incidentally with Geography.

In planning such a course we must be guided in the selection and arrangement of subject matter. The following ideas have been helpful:—

1. Begin with the home and home neighbourhood.

Children should in their early years receive a clear idea of the world—whole of the great earth as a globe with its land and oceans. While the time required to impart a clear and simple grasp of the world whole is small, the time on the other hand required to impart the knowledge of one's surroundings, so rich and varied as they are, is greater, and therefore should predominate.

This outward movement includes eight important topics. (1) Food products and occupations connected with them. (2) Building materials and related trades. (3) Clothing materials used and manufactures. (4) Local commerce, roads, bridges, railroads, tramways, river transport. (5) Local surface features, streams, lakes, hills, woods, sea, etc. (6) Town and provincial government, court houses, council chambers, municipality, P.W.D., etc. (7) Climate and seasons, sun, wind, storms and heat. (8) General manufactures; local industries.

Food Products.—Paddy Cultivation.—Rice being the staple food of the people, a fully outlined series of lessons should be given at different periods of the year. In a country school a series of repeated excursions to a paddy field should be schemed. With town children systematic lessons, with plenty of illustrations in the form of post cards, models of miniature paddy fields, with grain sown, nature lessons on germination, etc., should be given. *Lesson I.—Introduction*: Begin with a short historical sketch dealing with ancient times, during which the inhabitants of Ceylon depended entirely upon local produce. Call attention to the difficulties overcome when quickened by necessity. *Apparatus*: Model of paddy field with germinating grain. Miniature plough and buffaloes. Seed paddy in different grades of germination prepared beforehand by teacher.

Subject Matter.—The field (deal with the method of preparing the soil for ploughing). The ploughing of the field till all the uprooted vegetation rots. This lesson should be given out-of-doors near a field which is just being ploughed. As the temperature of Ceylon changes little throughout the year the farmer arranges his time of ploughing and sowing according to the average conditions of rainfall in his district. The first lesson should be given then. *The Plough*: Let the children examine the plough. Encourage them to sketch the different parts. Refer to the buffaloes who help the ploughing by their own trampling. *The Seed*: Refer to the preparation of the seed. How it is soaked in water for 24 hours, spread on mats and covered with green leaves of the plantain and left to germinate. (This can be tried by the children at home or at school). The seed is then ready for sowing. Refer to the drainage of the surplus water in the field, and the even scattering of the seed. The repeated flooding of the fields after the plants attain the height of three inches, after which the water is allowed to remain till the corn ripens and harvest is near.

A lesson may be given as a sequel to the above on *Irrigation* in a very simple way. This can be done either by means of models of clay and rubber tubing attached to water supply, or in the garden with prepared drains, etc. The method of storing water by means of tanks should be dealt with, with plenty of illustrations, showing tanks in Ceylon.

Lesson II.—Harvest.—Apparatus, sickles. This lesson, too, should be demonstrated out-of-doors if possible. A day before the lesson the teacher should interest the children in the different ceremonies performed after harvesting, as the time for the lesson is limited and they may not have a chance of witnessing them. It can take the form of a language lesson, the teacher providing pictures of the different ceremonies performed. *Reaping*: Let children examine sickles and sketch them. Call attention to the method in which the reapers begin their work; how they stand in a row and work parallel to each other; how they laugh at the slow reapers left behind them. Refer to the tom-tom beaters, who enliven the place with music. Refer to the binding together of the sheaves.

The Spring Meeting of the Council.

The Branches of Hampshire, Bournemouth, and Portsmouth have jointly invited the Council to hold their Spring Meeting in Hampshire. They extend the invitation to other members of the Association who may wish to visit the district and would like to be present at the various meetings and excursions. Hospitality will be offered to members of the Council and lodgings found for others who decide to come. All communications should be addressed to Mr A. Frearson, 72, Howard Road, Southampton.

PROGRAMME OF MEETINGS AND EXCURSIONS.

Thursday, April 7th.

2-30 p.m. Assemble at University College: Exhibition by Colonel Dudley Mills of reproductions of maps and globes relating to the age of Geographical Discovery.

4-30 p.m. Welcome by College Authorities and officials of Local Branches: Address by Louis J. Steele, Esq., M.I.E.E., President of the Portsmouth Branch.

5 p.m. Tea by the invitation of University College in the College Refectory.

6 p.m. Council Meeting in the College Library.

7-30 p.m. Public Lecture by Sir Halford J. Mackinder, M.P.

Friday, April 8th.

9 a.m. Assemble at Tudor House: Visit to places of historical interest in Old Southampton; Leader, W. Dale, Esq., F.S.A.

10-15 a.m. Assemble in Library of Ordnance Survey Office: Lecture by Colonel Sir C. F. Close, K.B.E., C.B., F.R.S., Director General, on "The Making of an Ordnance Map." The lecture will be followed by a visit to the various departments of the Ordnance Survey Office.

12-45 p.m. Motor run through the New Forest, via Lyndhurst, to Bournemouth. (Will visitors please notify to Secretary if they wish to book seats not later than March 25th).

2-30 p.m. Arrival at Christchurch: Visit to the Priory and possible visit to Hengistbury Head.

4-30 p.m. Tea and Reception at Bournemouth.

7 p.m. Public Lecture by W. H. Barker, Esq., B.Sc., F.R.G.S., Lecturer in Geography, University College, Southampton, on "The Historical Geography of the Hampshire Basin."

8-30 p.m. Return to Southampton.

Saturday, April 9th.

Visit to Winchester, organised by D. T. Cowan, Esq., M.A., Director of Education for Hampshire, including visits to the Cathedral, conducted by the Rev. Canon Vaughan; to the School; to the Castle, and the Hospital of St. Cross.

Joint Secretaries—

Miss M. E. Lancashire, Secretary, Portsmouth Branch.
Mr A. Frearson, Secretary, Hampshire Branch.
Mr J. Scattergood, Secretary, Bournemouth Branch.

Report of a Discussion by the Northampton Branch of "A Scheme for a First Course in Geography."

(Price 1/1, post free, from The Geographical Association, 1, Marine Terrace, Aberystwyth).

The members of the Northampton Branch expressed their warm appreciation of the work of the Hampshire Branch Committee who drew up a syllabus which teachers of Geography could not fail to find stimulating and suggestive.

A very large number of points were raised during the discussion, and it is only possible to report on the outstanding ones.

1. One of the openers stated his opinion that the Scheme was fundamentally sound, since it emphasised FACTORS and not facts.
2. Another commended particularly :—
   - (a) The additional syllabus for Standards I. and II. as being especially adapted to rouse the interest of the younger children in elementary schools.
   - (b) The list of apparatus and illustrations on page 16.
3. It was the prevailing opinion that the Syllabus was a good IDEAL scheme, but that in some respects it assumed too much reasoning power on the part of the children. For example, in Section B prevailing winds are taught at 10—11 years, and in Section C migrations of heat belts, etc., a year later. Many people considered that these subjects should be left till later in the school career.
4. In this connection, too, the criticism was made that, to cover the geography of the world in three years, would necessitate treatment which could only be superficial, taking into consideration (1) the small amount of time given to this subject, (2) the negligible amount of home-work done in elementary schools, (3) the very varied standard of intelligence among the children.
5. The opinion was also expressed that in the Scheme not sufficient attention is given to the Geography of England and the local County.
6. Some people considered that greater emphasis should be laid on the influence of altitude on climate.
7. The syllabus (up to 11—12) was discussed as a basis for Secondary School work, and it was criticised on the grounds that it attempts in Elementary Schools to cover in three years what in Secondary Schools can only just be covered in five years. This under the existing examination schemes leaves very little that is absolutely fresh to the children for the Secondary Schools to tackle.
8. The principle of following in detail an elaborate Scheme was criticised adversely as restricting the freedom of the teacher, and the preparation of a Scheme of the MINIMUM amount of fact which should be taught was suggested. It was agreed that this should be discussed at a meeting of the branch early in the New Year.

M. A. WALLER.

PAINTINGS OF LAND FORMS. Those who are interested in Land Forms or who have attended Summer Schools in Geography at Aberystwyth, are advised to make a point of visiting the Burlington Galleries, Leicester Square, between April 6th and April 26th, to see an exhibition of paintings of Cardiganshire Land Forms by Monsieur Valerius de Saedeleer, a Flemish artist, who has been studying British Scenery since 1914.

The Geographical Association.

Conference of Educational Associations* to consider the position of Geography (held in the London Day Training College on Monday, January 10th, 1921).

Having considered the importance of Geography in education, especially at the adolescent stages :

i. For training future citizens to appreciate accurately the interaction of human activities and their topographical conditions ;

ii. As a subject correlating the physical sciences and the humanistic studies ; and

iii. As a broadening and liberal influence in education for business life ; this Conference requests its Members to communicate to the Bodies they represent the desirability of action in support of the removal of restrictions which at present prevent Geography from being a full subject in the Advanced Courses sanctioned by the Board of Education for Secondary Schools and from becoming an adequate part of the curriculum in the upper forms of Secondary Schools.

This Conference further asks its Members to communicate to the Bodies they represent the desirability of action in favour of securing more freedom of grouping of subjects in advanced courses and in the work of the Upper forms of Secondary Schools, not only with a view to preparation of pupils for University work, but also to their preparation for business and other careers.

*The Bodies which kindly selected representatives to attend the Conference included the London County Council, the Workers' Educational Association, the National Union of Teachers, the Teachers' Guild, the Associations of Head Masters and Head Mistresses, Assistant Masters and Assistant Mistresses, the Imperial Studies Committee of the Royal Colonial Institute, the Geographical Board of Studies of London University, the Royal Geographical Society, and the Geographical Association.

The London Terminal Aerodrome.

By E. J. Orford.

On Saturday, January 8th, 1921, a party of sixty members attending the Annual Meeting of the Association paid a visit to the London Terminal Aerodrome at Waddon, near Croydon. The visit, though necessarily of a brief and rather hurried description, was thoroughly enjoyed by all taking part, thanks to the efforts of Captain Glasson, who conducted us. Fifteen members, in two sections, were able to make flights round the neighbourhood in the g-easi of the Instone Air Line.

On our arrival a meteorological unit was set working to find the speed and direction of the wind at levels of 500 ft., 1,000 ft., 1,500 ft., and so on. A rubber balloon, filled to rise at the rate of 500 ft. per minute, was released, and its course followed by a theodolite. At the end of each minute the angles of altitude and azimuth were read and the required rate and direction computed by means of graphs. The results obtained were as follows :—

PILOT BALLOON ASCENT—8th January, 1921.

Station, Croydon. Height above M.S. L. 76m. Time of start, 11h. 10m.

Day Ascent. 19 gm. Rubber Balloon. Free lift 62 gm.
Upward **V** = 500 ft./min. (q = 81).

Mark for Azimuth, East Croydon Church, bearing 58° from **N**. Balloon lost n distance.

Surface Wind (30ft. above ground) 2 mph f/s. at 268° Weather C. 2f.

Note.—First $\phi = 180° + \mathbf{A}$. First **V**=500 : **E**(**E** < 20°) = 450 ÷ **E** (**E**=20° to 40°) approx. Temp. 40° F.

Time from Start Minutes **t**	Azimuth Degrees from **N**. **A**	Elevation. **E**	Height. 100's of feet. **h**	Distance East. **DE**	Distance North. **DN**	**Vw** to **E**	**Vs** to **N**	Wind Direction. Degree from **N** ϕ	Wind Velocity. mph. **V**	Meteor R.A.F. etc.
½			2·5							
1	99·0	22·7	5	+ 11·8	— 1·9	+ 11·8	— 1·9	279	14	mph
2	116·0	19·9	10	+ 24·9	— 12·1	+ 13·1	— 10·2	308	19	320°/21
3	130·0	18·6	15	+ 34·3	— 28·7	+ 9·4	— 16·6	332	22	
4	136·2	17·9	20	+ 43	— 45	+ 9	— 16	331	21	328/21
5	138·1	17·5	25	+ 53	— 59	+ 10	— 14	324	20	
6	138·1	18·1	30	+ 61	— 68	+ 8	— 9	318	14	318/15
7	138·0	18·4	35	+ 70	— 78	+ 9	— 10	318	15	
8	138·4	18·5	40	+ 79	— 90	+ 9	— 12	323	17	319/18
9	138·2	18·3	45	+ 91	— 102	+ 12	— 12	315	19	
10	137·5	17·6	50	+ 107	— 117	+ 16	— 15	313	25	317/22
11	137·8	17·4	55	+ 118	— 130	+ 11	— 13	320	19	
12	138·2	17·3	60	+ 128	— 144	+ 10	— 14	324	20	323/20
13	138·8	17·2	65	+ 139	— 158	+ 11	— 14	322	20	
14	139·3	17·3	70	+ 148	— 173	+ 9	— 15	329	20	321/17
15	139·2	17·4	75	+ 157	— 181	+ 9	— 8	312	14	
16	139·0	17·2	80	+ 170	— 195	+ 13	— 14	317	22	316/22
17	138·8	17·1	85	+ 183	— 208	+ 13	— 13	315	21	
18	138·7	16·8	90	+ 197	— 224	+ 14	— 16	319	24	319/22
19	138·7	16·7	95	+ 209	— 237	+ 12	— 13	319	20	
20	138·6	16·5	100	+ 223	— 253	+ 14	— 16	318	24	317/23
21	138·4	16·4	105	+ 236	— 266	+ 13	— 13	315	21	

Under good conditions a balloon can be followed for twenty minutes, i.e., to a height of 10,000 feet.

While this observation was made, the mail set off to Paris. Some signal rockets, timed to burst at 500 feet and sent up for our benefit, had the undesired effect of recalling it to the ground, whence a second start had to be made.

In the hangars a number of machines engaged on the London—Paris, London—Amsterdam routes were examined.

The wireless rooms proved of exceptional interest, as it was possible to hear telegraph messages being sent to Lympne and also to listen to wireless telephone messages from Cricklewood. Some interruption was caused by the intrusion of a high power station which a direction finder, aided by a map and protractor, located at Dunkirk in a way that made one feel that after all "Practical" Geography had its value. So, too, with the special wireless masts, whereby aircraft can draw lines on Croydon and other stations and by a process of resection (which may be carried on in the air) obtain their positions in thick weather.

Croydon is a State-owned customs aerodrome, under the direction of the Controller General of Civil Aviation, and is the London Continental Air Terminus. Here aircraft entering or leaving this country can obtain a customs clearance as do ships at sea ports.

The latest types of ground equipment affecting such matters as night-flying, meteorological information, signalling, etc., are either installed or in process of installation.

Notice boards situated near the Customs Office give full details of machines due to arrive or depart during the day, of those actually in transit, and of the times at which these latter pass over Lympne Aerodrome on their way to or from the Continent.

The Customs Office is a fully equipped Customs Clearance Station, where two officers of His Majesty's Customs are in constant attendance to clear all outgoing and incoming aircraft. The officer on duty also acts as aliens officer for the examination of pass-ports.

From the Meteorological Office are issued hourly reports on the weather conditions prevailing on the London to Paris, London to Brussels, and London to Amsterdam routes, which are posted on a notice board at the Aerodrome. Special detail reports to cover any route or time are also issued on demand. Daily forecasts obtained by wireless from the Meteorological Headquarters at the Air Ministry are also issued, and an hourly wireless weather report is sent to Paris, Brussels, and Amsterdam. There is a system of signalling, for night flying, with flares, electric landing lights, a lighthouse and searchlights. A compass swinging base installed on the Aerodrome is available to facilitate the correction of compasses.

The great speed of aircraft necessitates the speeding up of communications along the aerial routes generally. It is, therefore, necessary for Croydon to be in direct touch with the terminal stations at Paris, Brussels, Amsterdam, and with intermediate stations on these routes, such as Lympne and St. Inglevert. Wireless stations have been provided by the British Government at Croydon and Lympne; by the French Government at Le Bourget (Paris) and St. Inglevert; by the Belgian Government at Evère (Brussels); and by the Dutch Government at Schipol (Amsterdam). The departure of an aeroplane is announced by wireless to the terminal station and also to the next station along the route from the departure station. In addition to the messages regarding the machines, meteorological reports are also passed along the different routes by wires giving the state of the weather at various points on and near the routes. Aerial transport firms are therefore enabled to decide whether to despatch their aircraft.

In the short time at our disposal it was not possible to give much consideration to geographical details, but a few points stood out clearly. Convenient as it would be to have machines landing in the middle of London, the provision of a very large, flat, clear space obviously made it necessary to go outside. It is almost beyond a doubt that a " settlement " will spring up directly dependent upon the aerodrome, but its character is at present problematic. The first business of a subsidiary character to establish itself would seem to be the Aerodrome Hotel, where meals and accommodation are provided for passengers arriving from the continent and for the officials. Here is an interesting piece of work for a local branch of the Association—the plotting of the steps in the growth of one of our first aerodrome towns.

N.B.—The quotations are from a pamphlet supplied at the aerodrome.

Mr Sydney Herbert, who has already sent us interesting notes on France, writes giving notes of a matter he has traced in some of the Cahiers de Doléances issued at the time of the French Revolution (1789).

The inhabitants of the communities of Lauruns, Gere-Bélesten, Aste-Béon, and other communities of the valley of Ossau in Béarn begged the National Assembly to enlarge their arable lands, which were so small that they yielded barely a three months' supply of corn, and they were forced to depend on the transhumance of their herds between the plains and " landes " of Bordeaux in winter and their mountain pastures in summer.

The Etats of Béarn had obtained two royal edicts permitting enclosures of lands and forbidding the transhumant herds from passing over the lands of other communities. The communities were allowed by the King to continue to move their herds through these lands.

At the Revolution the complaint is made that the large tenants have taken to enclosing land, following the example of the aristocracy, and that this makes pasturing impossible, so that the communities are in danger of starvation.

The interest of the matter is the evidence of conflict between cultivators and shepherds, the former enclosing, the latter protesting. This conflict is as old as agriculture itself, and even comes into ancient Welsh folk tale in " The Curse of Pantannas," in which story the hill shepherds (fairies) wreak vengeance on a farmer in the valley who has " ploughed up the fairy rings." A still older reference to the same conflict is the story of Cain and Abel.

Geographical Section, Naval Intelligence Division. Publications: I.D., 1096, Serbia, etc., 1920; 7/6; 533 pp. I.D., 1189, Portuguese E. Africa, 1920; 7/6; 552 pp. I.D., 1211, Alsace Lorraine, 1920; 7/6; 422 pp. I.D., 1215, Syria, 1920; 10/-; 724 pp. I.D., 1204, Roumania, 1920; 5/-.

These books are very valuable contributions to a knowledge of modern conditions, and some include statements about changes near, if not after, the end of the war. The books are on different lines. That on the Western Balkans has an introduction of 50 pages on physical and social geography, and is followed by long and detailed itinerary with minute facts of much interest about cultivation, populations, activities, and so on, information almost impossible to get elsewhere. There are glossaries, catalogues, details of weights and measures, and so on. That on Portuguese East Africa is a most valuable geographical treatise of a more usual character. Here again is valuable, nearly up-to-date, material impossible to obtain elsewhere and essential to anyone who needs to follow colonization of Africa.

Alsace Lorraine is first discussed in regions and then, after an account of its physical geography, its population and a sketch of its history, there follows a long economic survey.

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The Content of Historical Geography.

The following two summaries represent outstanding views expressed during a discussion on the above subject at the Annual Meetings of the Association, January 7th, 1921. Mr FAIRGRIEVE opened the discussion as follows :—

IN a sense education is one, as the world is one ; but though it is one, it is not a homogeneous whole, and we find it convenient to take certain groups of facts at a time, so that we have " subjects " in school and university. From the nature of the case, each subject touches others, especially if it is an educational subject. Now geography touches so many other subjects, it is so fundamentally educational, that the question of border-line matter is specially important, and it is specially necessary, in order to avoid friction, to have some kind of understanding between the teachers of geography and the teachers of other subjects. These matters are indeed in process of being settled. There is still a little doubt as to where the frontier between geography and geology comes, but we are much more sure of our ground than we were ten years ago. The same may be said with regard to surveying and other subjects.

History and geography are extraordinarily closely interwoven, and not only are the difficulties and dangers therefore doubled, but it is doubly necessary to avoid them if possible. Solutions have been attempted. It has been suggested that they should be taught together : it is, however, safe to say that up to the present experiments in this direction have not been successful, and perhaps this is not to be wondered at, seeing that the whole tendency of life seems towards specialisation of function. It is fairly certain that for some time anyhow we must consider the problems involved in teaching history and geography as separate subjects.

But the difficulty of Historical Geography is not only that it deals with what may be considered border-line matter. There is also the difficulty that there appear to be several quite distinct ideas of what Historical Geography is. There is the view (1) that it at any rate includes, even if it is not entirely concerned with, the History of Cartography or the History of Discovery ; (2) that it is concerned ONLY with the effects of geographical conditions upon history ; (3) that it is a common field for history and geography which both subjects unite to explore. I am afraid that my own view of what Historical Geography is differs from any of the three.

Now if we are to clear up the position, we must assume not only that history and geography are being taught separately, but also something as to what geography itself is. There have been many definitions, from " a description of the earth " and " the study of the earth as the home of man " to Dr. Unstead's definition " the science of the micro-organism and the space relations of its component parts."

We have had Mr Barker's illuminating phrase as to geography dealing with " the interpretation of the modern world." Perhaps, too, I may be allowed to say again that I consider that while history deals essentially with the drama, geography deals essentially with the stage. Now there is one feature common to all these statements, and that is that geography is viewed as dealing essentially with world-wide things NOW, and there is an almost unanimous suggestion that in the second place we desire to understand how this world came to be as it is now with an unexpressed idea that the study should throw some light on the future. We are in fact dealing with the setting of the stage, with a view to seeing how we have come to be conditioned as we are and how it may be best to act.

How, then, does Historical Geography fit in to this general scheme? In dealing with the bare boards of the stage, the physical geography in its narrower sense, we consider the relief of the land surface and how it came to have the shape it has. We consider climate, the flies of the stage, and how things in the atmosphere happen as they do. We consider how vegetation grows, how plants are found in such associations, and so on. But the curtain is never rung down on the world stage ; the actors are the scene-shifters, too. The stage is set " not only by natural forces, but by human effort." The past actors from immemorial antiquity have left things lying about. Nay, the actors, the stage crowd, are an essential feature of the setting. A vast deal of the setting of the stage is set by past happenings, and when we wish to understand the setting, we must go back not alone to pure geographic conditions, but to history. To my mind, then, Historical Geography deals with the discussion of how present conditions, the modern world, are the outcome of past happenings. We are dealing with the human factor, the factor that introduces choice, and we are dealing with the effects of that choice, made in the past, on present conditions.

Let me be quite clear. We are not concerned with all past history. We are not necessarily concerned even with the influence of geographical conditions on history ; that is a matter for the teachers of history. But we ARE concerned with the history which has left its effects NOW no the stage setting. Take an example. The discovery of the ocean in the Columbian period is a historic fact ; it is a historic fact that Peter the Great of Russia was obsessed by that discovery and its results, and chose—there was no compulsion—to make Petrograd not only a port, but the capital of Russia. The existence of Petrograd is a geographic fact. The conditions of the Russian stage now are connected with the situation of a capital away from the mass of the people and are themselves geographic facts. But any understanding of these geographic facts is quite impossible without an understanding of purely historic facts. The continuum expressed in shorthand by " Discovery of the Ocean—Peter the Great—Petrograd—Russia now " is Historic Geography. Happenings in Egypt 2000 B.C. may be essential facts in the Historical Geography of Britain, whereas matters in which geography controlled the history of a century ago may not, if that history has left no perceptible trace on the stage now, or at most a little dust on the carpet.

Geologists, Botanists, Meteorologists, and Surveyors require to know some geography, but they do not therefore think of the geography they require as geological geography or meteorological geography. Neither ought we to call the geography teachers of history ought to know Historical Geography. In practice it may be convenient in any institution, school or college, for a geographical member of the staff to give instruction in such geography as is necessary for the historian, but that is by no means the geography the citizen ought to know ; that is the geography which is handmaid to history, and it is the geography to which history is handmaid that we as geographers are concerned with.

We do not wish to belittle History. Very far from it. The citizen ought to understand the action of the drama if he is to understand the modern world. That is a matter for the teacher of history. We as geographers are concerned with the cumulatively overwhelming importance of the past, a past, geological, meteorological, or botanical, as well as historical. Things are now because they have grown to be what they are. The lesson of historical geography is that there is no possibility of " starting fresh." The continuum is an organic continuum, and it is this which must be insisted on.

Note 1 :—It may be said that I unduly limit the scope of Historical Geography. I confess I am not impressed by the argument that perhaps I do not include everything that possibly might be included. It MIGHT (though I do not think it would) unduly limit the work of research students at Universities. But I am not thinking of them. Some of the best of such work is normally done on the border-line of subjects. I am thinking of ordinary syllabuses, and in practice I am sure it will include everything of value which by any possibility there is any time for, and it will include a great deal more of value than there is any time for.

Note 2 :—I deprecate any separate TEACHING of Historical Geography in schools just as much as I deprecate the separate teaching of physical or climatic or structural or economic geography. But we should have in our own minds a clear idea that certain aspects of the whole subject of geography which may be grouped under the heading " Historical " should be included ; and we should have a definite end in view in including them.

Towards the end of the discussion Professor MYRES spoke. He agreed with Mr Fairgrieve that the function of geography in education was to ensure that the young folk entered on their life work with a just conception of their surroundings as they were in the present, and some training in the recognition of the principal factors which are interacting ; also that the function of historical geography is to ensure that the present is apprehended as a stage in a continuous process, and that that process, so far as man is concerned, is a process of adjustment between man's needs and aspirations on one side, and the geographical factors which limit or permit his realization of desires and ideals. All events happen, and all human efforts are made, someWHERE and someWHEN : they have a geographical and also a historical aspect. The practical problem is to decide how far and for what reasons the geographical or the historical aspect should be emphasized at each stage of education. He suggested that the practical difficulties arose partly from the fact that the geographical and historical aspects were liable to be confused respectively with the physical and the human aspects of those events and processes in which man takes part ; with the result that in the past geography had been regarded too much as if the factors under review were wholly physical, and history as if it were to deal wholly with the human factor. What was wanted was fuller recognition that all geographical facts had a human interest, more or less direct ; and that all historical facts had a physical interest, inasmuch as they each occurred in some geographical situation. Parenthetically, this view of the field of study as the reaction between living effort and a physical environment covered much that lay outside human history : the pterodactyl, in his own times and places, was engaged in the same type of biological effort, to live well himself and ensure his eventual replacement by more, and perhaps better pterodactyls, as the most recent vertebrate with most highly specialized brains.

Mr Fairgrieve was probably right in insisting on a preponderance of the geographical aspect in the earlier stages of education, for the reason that whereas the child is all unconscious how much there is to know about himself, he is acutely eager to ' find out ' about the external world. It is at later stages, and gradually, that his attention is diverted from the physical factors in events to the human factor in its twofold aspect of his own abilities and efforts, and the abilities and efforts of other people, whose share in events begins to be distinguished from other external factors, and recognized as essentially akin to his own. In this fashion, historical studies, and the historical aspect of geography in particular, take their place in the scheme of training of the man as citizen. In higher stages still, and most of all in the training of the teacher, geographical and historical studies coalesce all along the line ; and the former schism between the two aspects in the lower stages will be best remedied by teachers who, whether teaching history or geography, are qualified to maintain a just perspective of the other aspects of the events with which they deal.

Mr Fairgrieve's conception of geography as essentially concerned with the present is educationally sound ; but he has rightly qualified it by the admission of such historical retrospect as will ensure right valuation of the factors of the present situation, and right estimate of the trend of the process, from present to future, in the light from past to present. This is the more important inasmuch as the object of education is to develop a critical judgment, as well as intellectual apprehension of the facts. By the example of his own outlook and handling, as well as by formal precept, the teacher may do much to qualify the pupil to distinguish between the standpoint of the geographer and that of the prospector for oil or cotton ; a distinction as necessary to observe as that between the historian and the politician.

Branch Reports.

* Indicates Representative on Council.

Birmingham.—Chairman: Professor Boulton. Vice-Chairman: Mr W. H. Foxall. Hon. Sec. and Treasurer: Mr A. Dick. Committee: Messrs J. A. McMichael, W. B. Urwin, L. Harrison, F. Whittingham, and Misses F. L. Jones, M. Morris, M. Courtenay, and Hippisley-Barnes. *Miss F. L. Jones and *Mr W. H. Foxall. Numerous lectures and excursions have been organised and also an exhibition of text books. The Classical Association invited the branch to attend its lectures, including one on the Growth of Greek Geographical Ideas. A small study circle met regularly and drew up the valuable bibliography of the Savannah Lands, published in the "Geographical Teacher," No. 57, Summer, 1920.

Bournemouth.—President: Mr A. Barraclough. Vice-Presidents: Messrs W. H. Barker, F. W. Ibbett, Painter, and J. Scattergood. Hon. Secs.: Miss L. E. Phillips and Mr J. Scattergood. Committee: Messrs Kinsey, Perry, Seevior, Porah, and Arthur, and Misses Lee, Young, Fairweather, and Hallsworth. In spite of special difficulties, the branch has increased in numbers. Special tutorial classes have been arranged to deal with practical teaching problems, and are being held fortnightly.

Bradford.—President: Mr E. R.. Wethey. Vice-Presidents; Misses Roberts and M. C. D. Law, Messrs A. C. Coffin, G. Hastings, and L. S. Wood. Committee: Misses Hardwick, Barnes, and Ogden, Messrs O. Harding, A. B. Archer, J. Shaw, T. O. Balk, M. Myers, and E. Holt. Hon. Sec. and Treasurer: Mr E. E. Lupton. The branch has not only organised a successful series of general lectures and excursions, but has also arranged special courses of weekly lectures on Britain's Industrial North and on World Geography. An account of a motor tour undertaken by the branch appeared in our Autumn, 1920, "Geographical Teacher," No. 58. The Bradford Education Authority has set a fine example of progressive action in the cause of education. The geographical library at the Town Hall has been much augmented, grants have been given to enable teachers to attend Leeds University, and a special committee has been formed to organise geographical curricula in the schools and to discuss, report and advise on all geographical matters, whether of national or local interest.

Brighton.—President: Sir John Otter. Vice-Presidents: Miss M. Lawrence, Messrs A. O. Jennings, H. D. Roberts, C. Thomas Stanford, and F. H. Toyne. Hon. Sec.: *Miss E. C. Barrett. Committee: Misses E. Burn, B. Hopkins, J. Murray, Messrs E. Dewdney, H. Edmonds, *A. L. Minns (Chairman), and A. E. Wilson. The membership of the branch has increased rapidly during the year. Numerous lectures and excursions have been arranged, and the Brighton Education Committee has supported the efforts of the branch to organise a course of lectures on the teaching of geography.

Bishop Auckland.—Hon. Sec.: Miss E. M. Coulthard. *Miss Edwards. This branch was formed in January of this year, and has had a very successful start. Monthly lectures and excursions have been held, and the prospects for 1921 are very encouraging.

Bristol.—President: Dr. Lloyd Morgan, F.R.S. Vice-Presidents: Misses Mullock, J. B. Reynolds, and Shekleton, Messrs Elton, Foster, and Reynolds. Members of Committee: Chairman, *Captain Jervis, Misses Gracie and Watson, Mrs Cyril Walker, Messrs Beames, Muirhead, and L. Morris. The branch was inaugurated in March and is growing rapidly. Several excursions and lectures have been held, and there has been an interesting co-operation between historians and geographers.

Cardiff.—President: Dr. A. E. Trueman. Vice-Presidents: *Mr A. E. Hudson and Professor Cox. Treasurer: Miss F. J. Williams. Secretary: *Miss M. Lewis. Committee: Misses Allen, Hamilton, Knowles, and Launder, Messrs Davies and Jefferies. In addition to work in the direction of lectures and excursions, some members undertook a regional survey of the Cardiff district. The results were mapped, and these maps were exhibited at the British Association meetings, and are now deposited in the National Museum of Wales as a permanent record.

CREWE.—President: Principal R. Delaney. Treasurer: *Mr H. V. Davis. Secretaries: Miss D. M. Preece and Mr W. J. Lewis. Committee: Mrs Plant, Misses Edwardson, M. Jones, and M. Smith, and Messrs Hanna, Hodgkinson, Lloyd, Shimmin, and Tobler. The branch was formed in March and has held numerous meetings during the year. Several members are engaged on a Regional Survey of Crewe, and a bibliography of Cheshire is being prepared.

DURHAM.—Patron: The Earl of Durham, K.G. President: Mr A. J. Dawson. Vice-Presidents: Major C. Vaux, Col. W. H. Ritson, The Ven. Archdeacon Watkins, The Right Rev. J. E. Welldon, Councillor Potts, and Mr Jackson. Chairman: Mr F. D. Gleig. Treasurer: Mr Wilson Potts. Sec. for Durham: *Mr W. N. King. Sec. for Spennymoor: Mr F. J. Sawdon. - Committee: Misses Benson and Green, Messrs Bailey, Ditchburn, Blair, and Wright. The Central Association takes this opportunity of conveying its thanks to the Durham branch for the interesting programme carried out when the Council visited Durham in the Spring. The numerous lectures and meetings have, by the courtesy of the Durham Miners' Association, been held in the New Miners' Hall. The branch has also made a photographic survey of vanishing data, from which a set of lantern slides has been prepared. This seems a valuable suggestion of possible work for geographers everywhere.

ESSEX.—This branch was established in March, 1920, with Mr J. F. Blocksidge as Hon. Sec. and Miss Engvall as Treasurer. Meetings have been held at Southend-on-Sea, Grays, Halstead, Colchester, and Chelmsford. It is hoped to arrange an equally strong programme for this year, and the full complement of officers will be elected later. The branch is already one of our largest numerically.

EXETER.—Hon. Sec.: *Mr W. Stanley Lewis. The branch has only been in existence a few months, but is increasing rapidly, and has held several meetings.

HAMPSHIRE.—Chairman: *Mr W. H. Barker. Hon. Sec.: Mr E. F. H. Bratcher. *Mr A. Frearson. The membership of the branch is increasing rapidly, and the great enthusiasm which exists for geography is shown by the fact that weekly discussions on the teaching of the subject were held throughout the winter session.

HARROGATE.—President: Mr W. E. C. Jalland. Vice-Presidents: Councillor A. Lambert Foster, Alderman J. H. Lofthouse, Mr MacGregor, Councillor Mortimer, Messrs A. L. Thornton, A. Thoseby, W. P. Welpton, and W. H. Young. Committee: Mr Hyslop (Chairman), Miss Dodds, Messrs R. J. D. Belham and J. W. Mawson. Miss A. Wheater (hon. treas.) and Mr T. J. Forsyth (hon. sec.). The branch is only just formed, and hopes to get into full work in 1921.

HEREFORD.—President: *Miss Dodge. Vice-President: Rev. R. Warren. Hon. Sec. and Treas.: *Miss W. Pearson. Committee: Misses Coombes, Dredge, and Gamlen, and Mr Giles. The branch was formed early in the year, and has held well attended fortnightly meetings throughout the year.

HULL.—President: Mr H. Vigrass. Vice-Presidents: Misses Cumberbirch and Rowland and Mr Herdman. Committee: Misses Musgrave, Sharland, Thompson, and Corkery, and Messrs Bigford, W. Ward, and H. Wilson. Hon. Sec. and Treas.: *Miss M. G. Williams. In addition to lectures and excursions, the branch has co-operated with other Yorkshire branches in the compilation of a Yorkshire bibliography and a list of geographical novels.

NORTH LANCASHIRE.—President: Mr J. Thomas. Vice-Presidents: Messrs Herbert Grime, H. Eden-Smith, C. F. Markham, and T. S. Hird. Chairman: Mr A. Hawcridge. Hon. Sec.: *Mr F. H. Smith. Committee: Misses S. McDougall and M. W. Parkin, and Messrs A. E. Athersmith, A. Bond, *J. Dobson, C. E. Collins-Ralph, W. J. Rich, W. M. Surtees, R. H. Swainson, and J. Tyson. North Lancashire continues to be one of our largest and mose active branches, and it is to be congratulated on the specially useful way in which it helps groups of teachers in scattered country districts.

LEEDS.—President: Mr C. B. Fawcett. Vice-Presidents: Professor Kendall, Dr. Gilligan, and Mr Wethey. Chairman: *Mr M. R. Hughes. Committees: Misses Campbell, Chapman, and Heslop, Messrs Taylor and Vernon. *Miss Wharton and *Mr Hughes. Hon. Sec. and Treasurer: Miss Wharton. The branch successfully carried out its suggestion of 1919 and drew up, in co-operation with the other Yorkshire branches, a list of story books and novels useful in teaching geography. It also made the interesting experiment of co-operating with the Froebel Society in discussing the teaching of geography to young children.

LEICESTER.—President: Mr T. Kingdom. Hon. Sec.: *Miss MacLean. Hon. Treasurer: *Miss Sarson. Committee: Misses Devereux, Harding, and Roper, and Messrs H. H. Peach and T. Hollis. The branch commenced activities in May and is increasing rapidly.

LINCOLN.—President: Mr R. C. Minton. Vice-President: Miss Exton. Hon. Treasurer: Mr Wharhirst. Hon Sec.: *Miss E. W. Jones. Committee: Misses Amor, Kirk, Mason, and Sills, Messrs Baldwin, Holden, Pilling, and Shillaker. This branch meets a long felt need in the district, and a much appreciated aspect of its work was an exhibition of textbooks and scholars' work. The present inadequacy of railway facilities interferes seriously with the work of the branch.

LIVERPOOL.—President: Professor P. M. Roxby. Vice-Presidents: Messrs A. B. Archer, C. H. Cox, and W. Hewitt. Hon Sec.: *Mr R. H: Kinvig. Assistant Hon. Secs.: Miss Cleary and Mr Silverwood. Committee: Misses Graney, Wareham, Wigzell, and Winchester, Messrs Goggin, Price, Raffle, Spink, and Stead. The membership of the branch has almost doubled during the year, and new members continue to come in, so that Liverpool is now one of our largest, as well as one of our most enthusiastic branches. A special feature of its work is the help and support given to the numerous branches in the district.

LONDON, NORTH AND SOUTH.—Officers of North London Branch:—Chairman: Professor L. W. Lyde. Vice-Chairman: Mr C. B. Thurston. Committee: Misses Robertson and Shipperbottom, and Messrs Brooks and Young. Hon. Sec.: 1920, Mr R. J. Finch; 1921, Mr L. S. Suggate. *Miss Robertson and *Mr Thurston. Officers of South London Branch:—Chairman: Dr. J. F. Unstead. Vice-Chairman: Mrs Katz. Hon. Treasurer: Miss Beaumont. Hon. Sec.: Mr E. J. Orford. *Miss Beaumont and *Mr E. J. Orford. Excursions and lectures of special value for work on international problems were held in conjunction by these two branches. The London membership is increasing so rapidly that interesting developments may be expected in 1921.

MALVERN.—In spite of the severe illness of Mr P. H. L'Estrange, to whose inspiration and enthusiasm the branch owes much, a good deal of activity has been shown. Additions have been made to the geological and ornithological sections of the Regional Survey, and Mr Bennett's geological drawings and sections have been placed on view in the Public Library. Acting Hon. Sec.: *Mr E. W. Harris.

MANCHESTER.—President: Mr Spurley Hey. Chairman: *Mr T. W. F. Parkinson. Hon. Sec. and Treasurer: Miss D. Halstead. Committee: *Misses Marten, Talbot, and Osborne, and Messrs Gibson and Sowerbutts. The year has been marked by continued enthusiasm and a steady increase in membership.

NEWCASTLE.—The Central Association wishes to take this opportunity of conveying its thanks to the Newcastle branch for the most interesting programme carried out at the Spring meetings and for the very cordial hospitality extended to Council members. The activities of the branch this year have been very great and the membrship has doubled. Hon. Sec.: *Mr E. W. Heaton. *Miss E. O. Hardy.

NORTHAMPTON.—President: Mr J. L. Holland. Vice-President: Miss A. E. Bamber. Hon. Sec. and Treasurer: Miss M. A. Waller. Committee: Misses Bowser and Groves and Messrs Dixon, Field, and Jenkins. *Miss Bamber and *Mr Field. The work of the branch has been characterised by thoughtful research into problems of geographical teaching, especially on psychological lines. The results of discussions on the use of the Cinema were published in our Autumn "Geographical Teacher," No. 58. Co-operation with the Local Natural History Society has proved most useful to teachers of geography.

PLYMOUTH.—Chairman: Capt. Dodson. Vice-Chairman: Miss Wagstaffe. Hon. Sec. and Treasurer: Miss Pearce. Committee: Misses Basden-Smith, G. Jones, and C. Yeal, Messrs Bracken, Glanville, and Strachan. A special feature of the work of the branch was the organisation, in co-operation with the Local Education Authority, of courses of lectures on the teaching of geography. Exhibitions of teaching apparatus, models, and text-books were held. Various lectures of general geographical interest were held, and the year's work has been marked by great enthusiasm.

PORTSMOUTH.—President: Mr L. J. Steele. Vice-Presidents: Miss Cossey and Mr W. Chivers. Hon. Sec.: *Miss M. E. Lancashire. *Mr A. Stock. The first year's work has been very successful, and arrangements are being made to inaugurate a regional survey in 1921.

SHEFFIELD.—Hon. Sec.: *Mr A. W. Gaskin. The revival of the Geographical Association's work in Sheffield is proceeding rapidly, and much public interest in geology is being aroused.

SWANSEA AND DISTRICT BRANCH.—Chairman: *Dr. A. E. Trueman. Hon. Sec. and Treasurer: Mr S. W. Rider. A branch was inaugurated in Swansea in October. A good deal of interest has been aroused in the district, and sections are being formed at Port Talbot under the leadership of Mr W. J. Cosgrave, and at Llanelly under that of Mr D. E. Davies.

TOTTENHAM.—President: Mr J. H. Ford. Chairman: Mr A. J. Linford. *Messrs J. H. Ford and *A. J. Linford. Hon. Sec.: Miss H. Smith. Committee: Misses Bennett, Glen-Bott, Greener, Hill, and Wright, Messrs Dyer, Lynch, Restall, Shallard, Thurley, and Tudor Evans. The Tottenham branch was inaugurated during 1920, but the enthusiasm has been so great that it is already one of our largest branches. A special feature has been a course of lectures on the Regional Geography of the London Basin.

WARRINGTON.—Hon. Sec.: Miss M. Eckersley. *J. S. Broome. A good deal of steady work has been carried out, and special interest has been shown in historical geography and in the organisation of school journeys.

YORK.—Patron: Lieut.-General Sir Ivor Maxse. President: Professor Kendall.

Vice-Presidents: Miss Netherwood. Messrs E. Barraclough, J. A. Dell, C. E. Elmhirst, H. R. Morrell, Seebohm Rowntree, S. M. Toyne, P. J. Vinter, Rev. H. Walker, and Councillor Wilkinson. Committee: Misses Child, Hopkins, Linney, and Porteous, and Messrs Bell, Chapman, Dale, Evers, Hill, and Palliser. Hon. Sec.: Mr A. Hurworth. The branch was inaugurated in January, 1920, and has carried out a very thorough and effective programme during the year. A committee for a local regional survey is being formed.

North Wales.—President: Professor R. L. Archer. Vice-President: Principal D. R. Harris. Director of Investigations: Rev. T. Shankland. Secretary: *Miss Olwen Rees. A special zoology sub-committee for Regional Survey was formed. Chairman: Professor P. J. White. Director of Studies: Rev. T. Shankland Professor Orton and Organising Secretary: - Mr C. L. Walton. The valuable work of this sub-committee has been published and reported at the British Association meetings. Botany Sub-Committee: Secretary, Mr T. Whitehead. The distribution of pathological fungi was studied with practical results and reported on at the British Association meetings. An Archæological sub-committee (sec., Miss A. Gray) and a Geological section are also working on surveys. In addition to these varied activities, discussions, exhibitions, and general lectures have been held, and the branch has drawn up a tentative scheme of work for Standards I. to VI.

West Wales.—President: Mr W. E. Whitehouse. Vice-Presidents: Prof. H. J. Fleure, Prof. J. W. Marshall, Principal J. H. Davies, Mr R. U. Sayce, Prof. L. Lloyd Williams, Prof. W. J. Pugh, Dr. Stanley Smith, Mr R. D. Laurie, and Mr Evan Evans. Secretaries: Mr Ieuan T. Hughes and Miss G. Shawe. Treasurer: Mr E. E. Gomersall. Committee: Messrs E. Ewart Price, Iorwerth C. Peate, D. Trefor Williams, Chas. E. Jones, Leonard S. Higgins, D. W. Richards, and T. Warman, Misses E. Webster, A. Nott, S. Harris, E. Fowler, G. M. James, C. M. Edwards, and C. E. Brace. The branch has grown rapidly during the year, the numbers having doubled. A special feature has been papers by students, followed by discussions.

Geography by Discovery. J. Jones. 160 pp., 5 illustrations. 1920. Sedgwick & Jackson.

A little book which makes an attempt to give summaries and extracts from Marco Polo, Columbus, Magellan, Cartier, Frobisher, and a number of other English explorers and Lopez Vaz. It is a book worth getting for those teachers who delight in the work of the explorers, in order to supplement the most valuable series of abridgements of the works of great explorers published for schools by the Oxford Press (Romance of Travel Series). Exercises are suggested, but some teachers will doubt the value of several of them.

History as a School of Citizenship. H. M. Madeley. 106 pp. Foreword by the Master of Balliol. 15 illustrations. Oxford Press. 3/6.

The authoress attacks the current obsession of " The State " and especially " The State as Power " on the flank rather than directly. She owes a great deal to the ideas of Professor Geddes, and refers to several applications of them by Mrs Fraser Davies, Miss Barker, and others. Most of us will find a good deal to criticise, especially if we are among those who feel that the teaching of history should be recast to bring out the great fact that we, all the world over, are members one of another, but for every attempt to divert history from the mere memorising of old, unhappy far-off things let us give thanks.

School Camps. R. G. Hewitt & L. Ellis. Oxford Press, 1920. 110 pp. Map and Illustrations.

This is a little book full of practical directions for the Camp organiser, with brief suggestions added to indicate possibilities of education through camp life. The authors evidently see that the education so far as it is deliberate must depend on the teacher, and their book is largely limited to the practical advice every teacher will need.

Essai d'Astrometeorologie et ses Applications a la Prevision Du Temps. Par Albert Nodon. Gautier-Villars et Cie, 1920.

It is an old belief that the heavenly bodies have influence on human affairs and that by a study of their movements we may obtain some clues by the aid of which we may prophesy what is going to happen. Investigations seem to suggest that there may be some little foundation for this belief as far as meteorology is concerned. This book of M. Nodon's is a painstaking attempt to carry such investigations a step farther by a careful comparison of different meteorological elements, including magnetic storms and the zodiacal light, with the movement of comets, planets, moon and sun, and with changes on the surface of the last. He concludes his investigation with a statement of some conclusions that may be drawn as a help to forecasting.

J. Fairgrieve.

A Scheme for a First Course in Geography.

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By Olwen Rees, M.Sc.

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Books.—" A Nursery Geography," by Dickson and Morrow. Pub., Jack. 7/6.
" The Round World," by Ascott Hope. Pub., Blackie. 2/-.
" Children Far Away," by Fairgrieve and Young. Philip and Son. 1/6.

STANDARD II.—Stories of Journeys of Discovery and Life in other Lands. Direction Plans, 6in. map, 1in. map. Maps of Carnarvonshire, Map of Wales, Globe.

Books.—" Man and the Earth," by Page. Pub. by MacDonald and Evans. 2/-.
" Homes Far Away," Fairgrieve and Young. Philip and Son. 1/6.
" Famous Voyages of Great Discoverers," by E. Wood. Harrap. 2/6.

STANDARD III.—The British Isles :—Agriculture and Market Towns; Industries and Factory Towns; Fishing and Ports; Historical Geography and Place-names; Contour Maps and Sections; Lowlands and Railways; Highlands and Rivers.

Books.—" Rambles in Rural England," by Claxton. Harrap. 2/-.
" Journeys in Industrial England," by Claxton. Harrap. 2/-.
" The British Isles," by Fairgrieve and Young. Philip. 1/9.

STANDARD IV.—The New World :—*North America*—Early Voyages and Wind Systems; E. United States, Great Lakes, Ice Sheet and Water Power; Wheat, Cotton, Meat, Timber, Fruit; Time; Work of Rivers. *S. America*—Amazon and Hot Wet Conditions; Andes and effect of Altitude on Vegetation, etc. Comparison of Chile and Argentine with corresponding regions in N. America, Central America, and Panama Canal.

Books.—" United States," by Nellie Allen. Pub., Ginn and Co. 3/-.
" South America," by Nellie Allen. Pub., Ginn and Co. 3/-.
" In the New World," by Fairgrieve and Young. Philip and Son. 1/9.

STANDARD V.—The Old World :—Africa—Rainfall Belts, Vegetation Belts, Latitude and Longitude. Size of the Earth. Cape to Cairo Route and Surveying. Asia—Temperature, Monsoon Winds, India, China, Japan, Land of the Five Seas. Australia and New Zealand—Position, Climate, Vegetation, Occupation.

Books.—" In the Old World," by Fairgrieve and Young. Pub., Philip. 2/-.
" Tour of the World," by Page. MacDonald and Evans. 2/-.
" In Eastern Wonderlands," by Gibson. Harrap. 2/-.

STANDARD VI.—Europe and the British Isles—Position, Relief, Climate, Vegetation, Mediterranean Countries, France and Spain, Scandinavia, Switzerland, Land North of Alps, Russia; British Isles—Position, Relief, Climate, Agriculture, Industries, Commerce.

Books.—" Our Own Islands," by Mackinder. Philip and Son. 3/-.
" Europe," by Nellie Allen. Ginn and Co. 3/-.
" Europe and Britain," by Fairgrieve and Young. Geo. Philip. 2/-.

Correspondence.

To the Editor of the Geographical Teacher.

In omitting the title of Prof. Watts' book on Shropshire from your note at the head of my review, published under the title of "The Function of Geography" in your autumn number, 1920, pages 286 to 291, you have left your readers to infer that I was criticising the absence of proper geographical treatment from a book in which such treatment was not intended. The whole point of my review was that the book, by its title, "Shropshire, The Geography of the County," PURPORTS TO BE WHAT IT IS NOT. There is no question that it is "a valuable little book," as your introductory note says; but it is not a good example of county geography. Yet when so authoritative an author as Professor Watts gives forth a book as a County Geography, his readers, now and in the future, will have warrant for thinking that the contents of the book present county geography as he conceives it should be presented. It is an injury to the development of geography as a disciplinary science to give a distinctly geographical title to a book that treats of things, geographical and otherwise, in a manner that is not seriously geographical. Even if the author should now print a disclaimer, on the ground that the book was "written to fit a scheme which he had not designed," as your introductory note suggests, that would be of little avail, for such disclaimers seldom overtake the original statement. The mischief is done by the acceptance, over the author's name, of a geographical title for a book, the contents of which are in large part not particularly geographical.

Cambridge, Mass., W. M. Davis.
November 20th, 1920.

We have received the following from an Australian correspondent:—

QUEENSLAND GEOGRAPHERS.

At the thirty-fifth annual general meeting of the Queensland branch of the Royal Geographical Society of Australia, held recently in Brisbane, the Governor General, Sir Ronald Munro-Ferguson, congratulated the Queensland branch on its accomplishments. Leading men recognized that the pursuit of national science was the order of the day, but few perhaps realized what a wealth-producing factor the modern scientist was. It would be difficult to estimate the amount of material wealth which was the direct outcome of the travail of the scientist's brain. After referring to earlier day scientists and their work, His Excellency said the Society dealt with the great seaboard and the great landward area of Queensland, which presented features of peculiar interest. A good deal of information regarding the north coast of Australia, from Cooktown to Broome, had been made available, but much detailed knowledge was yet required to be gained. Of the great hinterland little was known, and indeed geographers had ever so much material at their disposal. Time was pressing, however, for the population of other lands were spilling over into other countries, and it would be well, therefore, to speedily determine what vacant territory was fit for settlement by our own race, and to discover how lands not at present fit for the white man could be rendered healthy and suitable for his habitation.

GEOGRAPHY IN THE CERTIFICATE EXAMINATION.

Sir,

As a member of a training college staff who has the duty of preparing students for the Board of Education certificate for elementary school teachers, may I draw attention through your columns to the retrograde nature of the type of questions set in the subject of geography in the recently completed examination?

The importance of this examination in our system of education is much greater than at first appears, as candidates enter from more than 60 colleges in England and Wales. These students, becoming the teachers of the future, will either consciously or unconsciously, carry into elementary schools the same methods of teaching by which they themselves have been taught in the training colleges. Therefore, when, as in this year's papers, entrants who have followed an advanced course in geography, and who have done work of a university standard with intelligence and enthusiasm, are required in a compulsory question to "name in a map the islands off the north and west coasts of Scotland and Ireland," the test really implies much more than its surface appearance of being an old-fashioned trap-question set to baffle an opponent who must play blindfold and with tied hands. Examinations are frequently taken as guides to future work by a successful teacher. This means a return to the old type of geography text-book with its lists of bays, capes, and the headlands for memorizing, together with the other unimportant facts included in the purely formal teaching of geography practised in the nineties.

Many elementary schools are only just beginning to realize the value of the subject as the study of human environment, which has given so real and vital an importance to geography in the curriculum; and so serious a set-back to the new methods as adopted in this important, because compulsory, examination, ought not, in the interests of modern knowledge, to be overlooked. A Training College Lecturer.

Reviews.

Meteorological and other Facts and Data. Negretti and Zambra. 1920. 40 pp. 2/6.

A handy and interesting compilation of a great many figures and tables a geographer in climate will not wish to have to carry in his memory, but may read for reference.

Modern School Atlas. G. Philip and Son. 1921. 12th Edition. 5/- net.

A revised edition of this well known class atlas with the changes in Europe up to date. The new edition has all the good features of the old one, and one or two of its altered maps of parts of Europe are improvements. The printing of the maps of Italy and the Balkans side by side is a great gain.

Political Map of Europe after the Great War. Published by Evans Bros. Price, 4d. 9½ in. x 16 in.

In view of the numerous queries we receive as to maps of the New Europe suitable for individual use in class, we draw attention to this hand sheet, which is useful in spite of small inaccuracies. This fourth edition is of special interest, as there are useful political maps of S.W. Asia and of Africa on the reverse side of the sheet.

Report of the British Association, 1920. (Brit. Assoc., Burlington House, London, W.1.).

The usual collection of presidential addresses, including that of Mr Macfarlane on the treaty settlement in Europe, will interest many readers, but in addition there are several important features. The reports on fuel economy with its details of coal export, on museums in relation to education, on training in citizenship, on the harmonic prediction of tides, and on the need for better training in surveying and geology, are all of interest to teachers of geography. The volume should be priced.

L'Europa Etnico Linguistica.

A set of 3 sheet maps in pocket, with short descriptive text, recently sent us from the Istituto Geografico de Agostini, Rome, Italy. The price marked is 6 lira, but at the present rate of exchange, this is a ridiculous amount. Purchasers would do well to use an ordinary British cheque form and cross out the £ mark, describing instead the amount of the payment. We should suggest sending 12 lira, which would be about 2/6.

The 3 maps are of language distributions in Europe, in Central Europe, and in the Balkans. As the new arrangement of Europe is so largely on the basis of language, teachers who wish to be in a position to teach European geography should get these good maps, back them with linen and use them for class demonstrations.

Meteorology. By R. G. K. Lempfert. Methuen. vi. + 186 pp. 7½ in. x 5in. 7/6.

Those readers who have used Mr Lempfert's small booklet, "Weather Science" (Jack and Co.), will welcome this larger volume. It contains a general survey of dynamical meteorology, with special reference to the developments of the last 15 years, but the book does not require acquaintance with advanced mathematics or physics. Geography teachers might note that much of the observational side and practically the whole of the climatological aspects of the subject have been omitted, nevertheless the explanation of many difficult phenomena are at last collected into a handy form. Individual teachers must decide how much of the book can be used in the geography class, but teachers themselves should have a personal knowledge of the explanations, and the book should be on the reference shelf of every geography library. It is difficult to summarise its contents into a short notice. Weather maps are described and classified, and then follow other chapters of special value to geographers on Pressure (useful statistics and account of new units); Wind and Relation of Wind to Pressure, Trajectories of Air Currents; Temperature and its Variation with height; Clouds (classification and good photographs); Physical Processes; Thermal Structure and Chemical Constituents of the Atmosphere; Tropical Revolving Storms. All sections are treated in an elementary manner. The more technical parts of the book deal with Line Squalls; Diurnal Variation of Wind; Winds of Free Atmosphere; Origin of changes of Pressure and The Stratosphere. There are numerous illustrations which have generally been carefully drawn, but the errors with regard to the course of the 400 metre contour line in figure 7 should be noted. W.E.W.

Land Form Map Book. By James Fairgrieve. University of London Press. 32 p.p. 11 in. x 8½ in. 2/-.

This graded course of exercises on mapping land forms will do much to solve the difficult problem of teaching pupils to "see solid." An extended test, by the receiver, with a large class has clearly demonstrated the value of the book. Recognition and classification of land forms from any maps becomes a simple matter; the drawing of contour lines to indicate an area described by the teacher or shown in text-book photograph or lantern picture presents little difficulty, and the construction of panoramas and problems of intervisibility, though not directly referred to in the book, naturally follow the course without further material being required. Merely as a source of block diagrams, photographic views, and accompanying maps, the book is well worth the price charged, and teachers who wish their map study lessons to become easier to themselves and periods of pleasure and education for their pupils, are recommended to use this book. W.E.W.

Philips' Senior School Atlas. Geo. Philip & Sons. 12 in. x 10 in. 10/6.

An atlas for senior pupils and college students. There are 72 coloured plates, with some 180 maps and diagrams. Changes resulting from the treaties of peace have been embodied, and there is a 32 pp. four-column index. To indicate the general scheme it will be sufficient to remark that ALL the recommendations contained in the 1915 Report of the British Association Atlas Committee have been incorporated. The volume forms a complete cartographical survey with special emphasis of physical geography facts, including climate and vegetation details. Some of the chief features are:—Maps printed on only one side of paper—double page maps on guards; projections named and equivalent wherever practicable; suitable scales which allow of easy comparison of areas; colours well chosen and of good register. The world isotherms, isobars, and isohyets are on charts with the pole at the centre, and there are numerous but not confusing insets showing larger scale details of important areas. The atlas is excellent value and is strongly recommended. W.E.W.

Notes on Geological Map Reading. By Alfred Harker. Heffer, Cambridge. 64 pp. 8¼ in. x 6in. 3/6 net.

This expensive little paper-covered book certainly gives some interesting tips on the deciphering of geological maps, and the principle followed of reading a map as a whole is one to be commended; the book also relegates the geological section to its proper, i.e., subordinate, position as a mere illustration of part of the facts. The chapters dealing with geological maps contain enough material to solve most of the problems likely to arise in the reading of large scale British maps. The first chapter, which deals with topographical maps and which should be of value to the geographer, is much less satisfactory and needs careful revision, e.g., there is a grave objection to speaking of the SOUTHERLY contour line (page 10) on a map which has no compass points indication; a "hill rising over 800 feet" is a bad method of describing one that rises over 400 feet above a pass and over 1,200 feet above the lowest part of the map (page 11). The method of drawing sections (page 13) does not explain fully the scale of the verticals. On page 14 one is referred to "figure 26 on the next page." Figure 26 is finally found on page 43, and in a map-reading book, at least, certain conventions should be obeyed with reference to making maps self-contained, and it is tiresome to have to read page 23 to discover the scale of the map on page 61. W.E.W.

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EDWARD STANFORD, Ltd., 12, 13, & 14, Long Acre, London, W.C 2.

Principles of Economic Geography. R. N. RUDMOSE BROWN. Pitman. 1920. 208 pp. 10/6.

An interesting and partially successful experiment towards a better treatment of economic geography, the aspect of our subject which of all others has for years been crying out for philosophical treatment. This book is essentially an outline which, in addition to stock information about crops and the like, discusses geographical factors of labour problems, of race transference and colonization, and of trade and trade routes. The reviewer's tendency would have been to give the book a stronger historical basis and to work more upon the great vegetational regions of their world with their characteristic human activities, but in this sphere there is abundant room for difference of treatment. Most teachers will find the book worth while for many details, and it is also quite interesting to read with an atlas. When Dr. Rudmose Brown issues a new edition will he please expunge the sentence about the Phœnicians as pioneers of trade; modern research has claimed to show that sea trade goes back into the third millenium B.C.

Michelin Map of the British Isles. Michelin Tyre Co. Price, in covers 9 in. x 4½ in., 3/-, mounted on canvas in sections; 1/6 on paper.

Notwithstanding the excellence of the Ordnance Survey Maps, there is much to recommend the above series which is so popular with motorists. A careful examination of the local sheet will also demonstrate to the teacher the advantage of having at least one sheet available in the geography class room. The maps vary in size, several are 40 inches by 18 inches, but the ingenious manner in which the map is folded allows of the tracing out of routes with an exposed surface which need not exceed 9 inches square. In general (26 sheets) the long edge of the complete sheet runs broadly east and west. It is a road map, with consequent exaggeration of road widths, but a good classification has been adopted, including a separate colour for picturesque routes. Convenient symbols for the indicating of three different gradients are used, and view points and directions for extensive panoramas are shown. All objects of interest on or near the routes have symbols attached, and the list of symbols, which is a comprehensive one, is clearly printed on the inside cover.

The scale employed is 1 in 200,000 or slightly more than 3 miles to the inch, consequently several of the maps cover some 7,000 square miles each. The whole of the British Isles are shown on 31 sheets, of which 9 are devoted to Ireland and 3 to Wales. The maps are very clearly printed and fully coloured, with railways in black, water in blue, and woodlands in green. All important road distances are shown and altitudes are indicated by spot heights on roads and trigonometrical stations on hill summits; a well drawn dark hachuring has also been successfully applied. Though the maps are intended to accompany the Michelin Guide to the British Isles, yet they are self-contained and are strongly recommended to the notice of interested teachers.

W.E.W.

Children of the Slaves. By STEPHEN GRAHAM. (Macmillan & Co.)

One opened this book with some misgivings, for about Mr Graham's earlier Russian studies there hung an unpleasant flavour of sentimentalism, and sentimentality is simply destructive of sanity in a discussion of the "colour" problem. But there was no need for suspicion. Mr Graham has written a vivid and interesting, if not profound, book, based on personal observations in the United States, where he pursued his inquiries in the principal "coloured" centres and followed the line of Sherman's march through Georgia on foot. His account of this experience alone makes the book worth while.

His analysis of the situation tells us nothing very new, save in so far he touches on the effect the War has had on the psychology of both White and Black. From the sociological point of view this is the most interesting section of the book. Very large numbers of the negroes have been affected by the struggle both economically and mentally. Those who served in the army acquired a new sense of dignity, and, alas! a deeper feeling of resentment against the Whites. Of those who remained behind, many were drawn out of the "Black Belt" by the lure of higher wages and new industrial opportunities. The net result has been to give a great impetus to the radical movement led by Du Bois which brands as slavish and ineffective the programme of peaceful educational progress formulated by the late Booker Washington. Of this left wing movement Mr Graham tells us much that is both interesting and new.

His remedy for the clash of races is indicated in sensible and manly fashion. The Negro must be allowed to develop his peculiar qualities in freedom and security; the policy of repression and suppression is as futile as it is infamous. If Americans cannot learn that lesson from their own experience, let them look across to Europe and see it written in blood and fire.

There are some curious omissions from the bibliography, notably of Cairnes' Slave Power, and it is strange that a volume which contains many references to John Brown should not even mention Garrison.

S.H.

The Red Man's Continent. Ellsworth Huntington. 1919. Six Illustrations and five Maps. 183 pp. Yale and Oxford Presses.

A most valuable little book for the teacher. He will find a simple summary of Huntington's ideas on man's reaction to climatic factors, with illustrative examples, especially from the New World. Following this is a discussion of the geographic provinces of America, with an attractive study of the garment of vegetation in North America. The latter is illustrated by a map of vegetational areas which, one is interested to note, is drawn by Mr Joerg on the basis of Unstead and Taylor. A long and fascinating chapter on various Red Men groups and how they live brings the book to a close. Save for a discreetly critical bibliography of a very few first-hand works, omission of discussion on or reference to Prof. Elliot Smith's views on Migrations of Culture is to be regretted. This is the first volume of the "Chronicles of America" series.

Illustrated Guides to the Battle Fields. Michelin Tyre Co., 81, Fulham Road, S.W.

Eleven of these guides are available, and the total price is approximately £2. They form one of the best available records of the character of the devastated areas. Their special value to geographers lies in their illustrations and numerous maps. The illustrations include carefully chosen panoramas indicated on the maps, and splendidly reproduced photographs of areas and buildings prior to 1914 and again at the close of 1918. In addition, there are many hitherto unpublished photographs of incidents which occurred during the period 1914-1918. As a permanent record of the magnificence of buildings and other monuments now destroyed, the books are most valuable. The text has been carefully written and the books are attractively produced. All are of interest, but special reference might be made to: Ypres (144 pp., 4/-; refers to surrounding villages also); Rheims (176 pp., 4/-. Political history and many photographs of details of interior of Cathedral); The Marne (264 pp., 5/6. Numerous maps and panoramas); The Somme, Vol. I. (136 pp., 4/-. Special reference to Albert, Bapaume, and Peronne); while smaller guides include Amiens (56 pp., 2/-); Lille (64 pp., 2/-); and Soissons (64 pp., 2/-). The guides are on sale on many of the railway station bookstalls.

W.E.W.

Geographie Humaine de la France. (Vols. 1 and 2 of Hanotaux Histoire de la Nation Francaise). Paris, 1920. J. Brunhes. ixxx. x 496 pages, 11½in. x 9½in. 12 coloured plates and many illustrations ; 85 maps and plans. 50 francs per volume.

This is a fascinating book, even if it is not quite on the same level as the author's "Geographie Humaine" published before the war. It avoids comparison with Vidal de la Blache by adopting a very different treatment, and, as we expect from Professor Brunhes, it goes into interesting details about geographical distributions of house types and many facts of rural life, including the arrangement of the population in districts of varying agricultural type. France is a fine subject for geographical work with senior scholars who are taking modern studies, and for such classes this book is quite invaluable, though it does not in any way supersede Vidal de la Blache (Tableau de la Geogr de la France) which was re-issued last year with illustrations at the price of 20 francs.

University of London, University College.

GEOGRAPHY.

E. J. GARWOOD, M.A., Sc.D., F.R.S., Professor of Physical Geography.
L. W. LYDE, M.A., Professor of Economic Geography.
M. T. M. ORMSBY, M.Inst. C.E.I., Reader in Surveying.
Professor H. N. DICKSON, C.B.E., M.A., D.Sc., F.R.S.E., Special Lecturer.
IRENE CURNOW, Assistant.

Particulars of Courses for Students of Geography, including those for the Diploma in Geography, may be had on application to the Secretary, University of London, University College (Gower Street, London, W.C. 1.).

Evolution of a Coast Line. Barrow to Aberystwyth and the Isle of Man. W. Ashton. Stanford. 1920. 304 pp. 10/-.

A book giving reflections based on personal observations and long familiarity with the district. The author upholds the heterodox view that sinking is going on and has been in progress since Neolithic days. This view is challenged by many researchers who believe that sinking movements occurring intermittently in prehistoric times, and varied by uplifts (see de Geer's work on Scandinavia), ceased about the beginning of our era. The author does not allow for probable consolidation of coastal boulder clay deposits which would facilitate the attack of the sea, nor does he help us much to understand the Sarns which project in a straight line from the coast of Cardigan Bay. For their explanation Prof. O. T. Jones has recently suggested that they are the remains of the divides between the river valleys which formerly existed on the as yet unconsolidated boulder clay.

In Unknown China. A record of observations, adventures, and experiences of a pioneer missionary during a prolonged sojourn amongst the wild and unknown Nosu Tribe of Western China. By S. POLLARD. London: Seeley Service & Co., Ltd. 1921. Pp. 324, with many Illustrations and 3 Maps. 25/- net.

The writer of this book entered the hitherto unknown Liang Shan Mountain country between the Yalung and the Yang-tse, and has thus been able to supply us with most valuable first-hand information of the independent Nosu hill people, whose more sinicised brethren are spread over a large area in Western China, and who appear to have traditions and race connections with people in parts of Tibet. His description of their warlike disposition, their feudal system, their independence of the laws of the surrounding settled Chinese population to whom they are a 'thorn in the side,' the many traces in their manners and customs of the important position of woman in their social organisation in contrast with the Chinese, and their traditional connections with Tibet and the Tibetans, are all characteristics which appear to confirm the view taken by Mr T. de Lacouperie, that they are descendants of the warlike Nung or Jung tribes whom we read of as appearing on the western borders of China about the 16th century B.C.

Much valuable information about these peoples has already been given by Messrs. E. Colborne Baber, A. R. Colquhoun, and T. de Lacouperie, amongst others, but in entering the fortress of Nosuland, where the important position of women has not entirely disappeared, where the horn-shaped head-dress which may be traced to Western Tibet and Northern India still survives, and where the descendants of the mixed Caucasic Jung tribes scarcely affected by Chinese ideals and blood are preserved, Mr Pollard has at great risk added to our stock of material facts which will help towards the solution of the difficult racial problems of this region, and in furtherance of which anthropological data concerning the Nosu, the Miau and the Shan would be both useful and welcome, could it only be procured. Whether these aboriginal and intrusive hill peoples prove to be a valuable asset or a serious menace to the new Republic will depend upon the manner in which they are approached and treated. Already men of Nosu extraction have proved their worth as provincial governors of China, and the Chinese have still much to learn from them in the way of sincerity and truth.

Altogether the book provides most interesting reading, and from it may be gathered ideas of the natural woodland and animal life, features of which the landscape of the greater part of China has been so completely denuded. E.E.G.

The Andes of Southern Peru.* An English edition of this book has been recently published by Messrs. Constable & Co. for the American Geographical Society, of which Dr. Bowman is Director.

This volume is one of the three larger publications of the American Geographical Society of New York and the second of the series. The first was the memorial volume of the Transcontinental Excursion of 1912, and consisted of 24 papers, mostly on the geography of the United States, in various languages, and was edited by W. L. G. Joerg; the third on "The Frontiers of Language and Nationality in Europe" was by Leon Dominian and was published in 1917. The particular volume under special notice appeared in 1916, and was then distributed gratis to the Fellows of the American

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*The Andes of Southern Peru. By Isaiah Bowman. English Edition (1920) published by Constable and Co. [10in. x 7in.; xi. and 336 pp.; 27/6 net.]

Geographical Society, while its price to non-Fellows was $3. The present price cannot be considered excessive in virtue of the contents and excellent make-up of the book.

The work has been reviewed by several geographers of differing interests, and one and all recognise the unusual value of the production.

The Yale Peruvian Expedition of 1911 had various objects. The work of the division under Dr. Bowman was, as indicated in the sub-title, "A Geographical Reconnaissance along the Seventy-third (W.) Meridian," essentially the preparation of a contoured map of the 200 miles' stretch of mountain country between Albancay and the Pacific coast, and the 200 miles of plane-tabling done by Mr Kai Hendriksen in two months under conditions of extreme difficulty is deservedly given an important place in the volume. Tropical plains, snow-covered passes with triangulation stations upwards of 17,000 feet above sea level, and desert coast were traversed, and the result is yet another illustration of the possibilities of highly skilled plane-table work; but this large book deals with much more than surveying methods. No matter how varied the interests involved, practically every geography teacher will find something new of interest and value. It is impossible to deal with more than a few of such view points. As suggested earlier, the surveyor will appreciate the maps, which are so excellently reproduced in colours. Seven topographical sheets are given [scale 1 : 125,000, with contour interval of 200 feet], and an appendix by Mr Hendriksen gives a full account of the methods employed. Some figures of interest are given, in which we learn that about 38 square miles were completed per day, being an average progress of some 7½ miles along the route. An average of three stations were occupied every two days, the highest being 17,675 feet, whilst the highest point located was 21,703 feet. The human geographer has also been particularly well catered for throughout the volume. Dr. Bowman believes that the region presents many clear cases of environmental control, differences of customs and character in Peru being strongly developed in spite of the small distances which separate unlike groups of people.

Chapters IX. and X. at the end of the human geography section, Part I., have been prepared with the assistance of Dr. Gladys Wrigley, and deal with the climatology of and meteorological records from the Peruvian Andes. Continuous weather records were taken by Mr P. B. Lanius at Yavero and elsewhere, and tables and graphs enrich the book.

It is impossible to deal in detail with the illustrations (upwards of 200) employed throughout the volume, but special mention should be made of the topographic and climatic provinces diagrams, particularly those dealing with cloud types and rainfall belts, and of the fascinating photographs of typical vegetation scattered throughout the book.

The eight other chapters of Part I. deal in turn with the "Regions of Peru" (Ch. I.), in which four typical inhabitants, viz., the forest dweller, the eastern valley planter, the highland shepherd, and the coastal planter, portray the four great regions. Ch. II. treats of the "Rapids and Canyons of the Urubamba" in the practically unknown vast forested realm of the eastern border of the Andes. Ch. III. and IV., "The Rubber Forests" and "The Forest Indians," contain much in explanation of the exploitation of nature-folk in selva country, e.g.: "When I once tried with money to pay an Indian for a week's services he refused it. In exchange for his severe labor he wanted nothing more than a fish hook and a ring, the two costing not more than one penny apiece. When his love for ornament has once been gratified, the Indian ceases to work . . . . so when money and finery fail the lash comes in." Ch. VII. deals still further with this subject and other important human geography topics under the heading of "The Geographical Basis of Revolutions and of Human character in the Peruvian Andes." Ch. V. is a delightful essay on the "Country of the Shepherds," and one is tempted to quote extensively from it. Chapter VI., which analyses the "Border Valleys of the Eastern Andes," includes some further accounts of methods of utilising the native labour. Ch. VIII. is a short study of the "Coastal Desert," and offers new opinions with regard to the development of irrigation projects.

The physiographer will find nearly half the book of peculiar interest to him, for Pt. II. deals with such topics as the "Peruvian Landscape" (Ch. XI.), with strikingly good photographs which assist in the reading of the pleasantly written text. The wonderful scenery with the great diversity of its elements and the aggressive character of the mountains give at first an impression of disorder on the grandest scale. Not once but several times is this thought suggested, but though any particular land form analysis had perforce to be hurried, yet the work never seems to be careless or incomplete, and the block diagrams, typical of American physiographers, are suggestive summaries of much of the argument in support of the classification of the land form types adopted. Then follow chapters (XII.—XIV.) dealing in detail with the "Western and Eastern Andes" and "The Coastal Terraces." "Physiographic and geologic development" hinted at in these chapters is made the subject for detailed treatment in the long following chapter (No. XV.), while "Glacial Features" (Ch. XVI.) occupy some 40 pages of text, photograph, and diagram. This closing chapter, though using the Peruvian Andes for illustration, contains a large amount of material suitable for general application in the somewhat conflicting theories dealing with glacial erosion.

Only a few of the more outstanding features of this interesting volume have been mentioned, but possibly sufficient to show its value as a reference book and enough to indicate that though its sub-title calls special attention to the seventy-third meridian, yet the contained material makes scientific comment on a much larger area.

Cause and effect are coupled again and again, and for those teachers who use the southern continent of the New World as their type region, the book will be invaluable.

W.E.W.

Pennsylvania :—

"SEEING PENNSYLVANIA." J. T. FARIS. Octavo, 350 pp., 113 illus., 2 maps. 21/-. 1920.

"IN OLD PENNSYLVANIA TOWNS." A. H. WHARTON. Octavo, 350 pp., 32 illus. 21/-. 1920. Lippincott, Philadelphia and London.

These are interesting examples of an American type of book describing in a pleasant way, with abundant illustrations, some parts of the United States and Canada. The survivals of old days in Pennsylvania among men and houses and towns are lightly treated by Miss Wharton, and the teacher who turns the pages over will follow with interest the resemblances between old American mansions and our own fine 18th century houses in so many little English towns. There are many snippets of biography and much personal matter, as well as sketches of the old life of these little towns. The great attractions of Dr. Faris' book are his varied illustrations of the Pennsylvania country, which are here described in a series of journeys. The teaching of the geography of N. America is so much enhanced when thought is given to the facts of the growth of the U.S.A. and the great Dominion, that we hope these books will be read and read along with the great works of Parkman and such books as Hawthorne's "Scarlet Letter" and "House of the Seven Gables."

Seeing the Far West. J. T. FARIS. Octavo, 304 pp., 113 illus., 2 maps. 25/6. 1920. Lippincott.

This is an easy description of the Rockies and the Pacific Lands of U.S.A., with accounts of the famous national parks and forests, the Colorado Canyon, Arizona, the desert, Utah, Central Oregon, California, the irrigated regions, the pioneer towns, and so on. One must learn to tolerate various unnecessarily picturesque phrases, but there is no doubt as to the value of the book to teachers and students. It is useful and welcome to have American books, other than the textbooks of physical geography, for use in the school library.

The World Wide Atlas. Political and Physical. 128 plates and index. W. & A. K. Johnston. 1921. 12½in. by 10in.; cloth, 15/- net.

This is a useful companion to the orographical atlas which gives physical facts but is often of little use for place names. Here we have comparatively few orographical maps, but an abundance of place-name maps with hachured mountains and abundant rivers. The number of unusual maps is very large, and many of them will be found most valuable, especially maps of parts of India, U.S.A., Chile, etc., etc. The European maps pre-suppose the ratification of the Treaty of Sevres, and some details elsewhere, such as the boundary of Esthonia, are inaccurate. It would in fact be worth the publishers' while to replace plate 34. The doubt as to Albania's southern frontier is not indicated, nor are the results of the Russo-Finnish Treaty included. On plate 31 Hungarian Ruthenia, now to be an autonomous unit under Czecho Slovakia, is not separated from the remainder of the latter State. France and Germany are inadequately treated. Numerous city plans are added. The atlas is cheap at the price and will prove most useful for the purpose for which it is intended.

Life of H. B. de Saussure. D. W. FRESHFIELD with the collaboration of H. F. MONTAIGNIER. 1920. Octavo, 480 pp. 25/. Arnold.

We congratulate our explorer ex-president on this valuable account of the famous traveller and explorer of Mount Blanc. De Saussure was born in 1740, and became one of the chief founders of the science of geology through his work on the Alps, which, thanks to him, were brought out of the realms of awe and fear and made the delight and the refreshment of man. There is a valuable account of the forerunners of modern scientists, including the almost omniscient Leonardo da Vinci, and the life which follows this helps not only to expound de Saussure's more scientific work, but also to shed light on the social and political conditions of the critical time when Switzerland was trending towards its modern position as the modern neutral State of federal type. There is also a great deal about Italy and an account of the "Grand Tour" which was at that time a part of the education of the gentlemen of Europe. The translations of letters are admirable and the style and sympathy of the writing such as we expect from Mr Freshfield. To those who are interested in the background of the European life of to-day we commend this valuable study of Europe at a period when men still struggled, as they must again try to struggle, to be good Europeans. There are 11 portraits, 10 other views of considerable interest, and two maps.

Mrs. Ormsby (née Rodwell-Jones) and Mr. Montgomerie send us a valuable six-inch map of the Walthamstow—Leyton district with contours derived from direct survey under her supervision. It should form a most useful basis for local studies and regional surveys, and its quality is as high as that of the work which has become typical for Mrs Ormsby's department at the School of Economics. Contours are at five-foot intervals with thicker lines at 25 foot intervals. The sheet is without names in order to be more useful for mapping of data. A useful feature is a circle in the S.W. corner giving the exact directions in degrees from true north. The latitude and longitude are also inserted in detail. The map is published by Sifton Praed, Ltd., St. James' Street, S.W.1., and may be bought from that firm for educational purposes.

Summer School in Guernsey, C.I.

TUESDAY, AUGUST 9TH, TO FRIDAY, AUGUST 26TH, 1921.

(Lectures to begin on Wednesday, August 10th, at 10 a.m., in the Queen Elizabeth's College, Guernsey).

A course of lectures on the Historical Geography of Europe and the new problems will be given by Dr. H. J. Fleure, Professor of Geography and Anthropology, University College of Wales, Aberystwyth, and on "The Effects of European Industrialism on Extra European Countries" by Mr W. H. Barker, B.Sc., of Southampton University.

Special attention will be given to Excursions, and short lectures bearing on the Regional study of the Islands.

The lecture fee will be £3 3s., and this should be sent on or before the 1st of July, 1921, to Miss R. M. Fleming, 1, Marine Terrace, Aberystwyth. All cheques and postal orders should be crossed "Lloyd's Bank, Aberystwyth."

Students are SPECIALLY ASKED to notify their intention of attending the course to Miss Fleming at AS EARLY A DATE as possible.

ACCOMMODATION.—Students will be personally and entirely responsible for accommodation arrangements. But as Guernsey is often crowded in August, arrangements have been made that places shall be reserved for some of our students at Mrs White's Boarding House. Terms:—10s. 6d. a day for board and accommodation; baths and afternoon teas extra. Students who wish to take advantage of this arrangement should write AT ONCE to Mrs White, Homelands, Le Febvre Street, Guernsey, C.I., heading their letters "DR. FLEURE'S SUMMER SCHOOL IN GEOGRAPHY," and enclosing a stamped addressed envelope for reply. Mrs White has kindly undertaken to pass on letters of application to other houses if she is full herself. She will be glad to know of students willing to share a room.

A Guide to Guernsey, with map and advertisements of accommodation and rail and boat details, may be obtained from the Secretary, Chamber of Commerce Advertisement Committee, High Street, Guernsey, C.I., for 3d.

Students sending enquiries to Miss Fleming MUST enclose a stamped addressed envelope for reply.

Editorial.

THE effort of our Association to win proper recognition for Geography in education is now entering upon a new phase, in connection with which we bespeak the help of all our members. Geography has now won its place in the more progressive Universities, and it is of the utmost importance for the status of the subject there and in the schools that original work done by experienced teachers after leaving the University should find opportunities of publication. The Association is convinced of the importance of the publication of monographs, and has arranged with Messrs. Benn for the issue of a series, commencing with a discussion by Miss M. C. Delany, M.A., of the Historical Geography of the Wealden Iron Industry. The notice facing the editorial shows that members who fill up the order form will get copies at 3s. each, whereas the published price will be 4s. 6d. The continuance of the series and of the special terms to members depends on the response to this issue, and we therefore beg members to do their utmost to support this important effort to ensure the status of the subject.

IN view of the high cost of publication, it has been decided to issue the index and title page of the last volume of the GEOGRAPHICAL TEACHER only to those subscribers who intimate their desire to get it by sending a message to the Clerk promptly on receipt of this Magazine. The index will be printed in July, but the number printed will depend on the messages received.

WE have great pleasure in congratulating the Leeds Branch of the Association on the thought and enterprise involved in the preparation of the "List of Novels" useful in Geographical Education. Assistance from certain sources, for which we are grateful, has allowed us to publish this without financial risk to the Association. It is on sale at 1s. (postage 1d. extra), and may be obtained from the Clerk. The Leeds Branch, with Miss Wharton as the chief organizer, prepared the list and arranged for the co-operation of the other Yorkshire branches in the work.

THE meetings of the Association's Council this Spring at Southampton were admirably organized by the Hampshire Branches, and we are sure that Geography is winning its deserved place in the educational schemes of that part of England. The co-operation of the University College, the Ordnance Survey, and many travellers, notably Colonel Mills, is a great feature at Southampton, and our only regret is that the coal strike and the fear of a railway strike reduced the number of members who would have come from other branches to learn of the great things Southampton is doing. In an address of welcome, Principal Loveday referred to the desirability of developing at Southampton a special Institute of Geographical Study, and pointed out that not only the proximity of the Ordnance Survey Headquarters, but also the existence of the premier port through which explorers and other travellers and administrators go out and return, could contribute materially to the development of the subject. The Association is grateful to Principal Loveday for his strong support. The old town of Southampton, with its Archæological and Historical Society and Museum, is a further point of great importance in this connection.

THE Association is having a somewhat difficult time this year owing to large numbers of members who have not yet paid their 1921 subscriptions. Those who have paid promptly are thanked for their support, and are specially asked to make arrangements, whether by filling a banker's order or otherwise, for payment of the subscription year by year in January. The payment of subscriptions in the first month of the year is essential for the maintenance of the Association. Under the circumstances it is appropriate to thank publicly a number of branch secretaries who have helped most materially by collecting subscriptions and forwarding them to the Central Office. Help in the direction of increased membership is as important as ever, and can promote most efficiently the aims of the Association to secure a better status for Geography in education and to develop an education towards peace and understanding in place of prejudice and war.

THE Bishop Auckland Branch must be specially thanked for its most generous contribution of five pounds towards the maintenance of the Geographical Teacher, and our gratitude also goes out to the hundreds of members who have sent gifts towards the special expenses of equipment that have had to be incurred recently.

SUMMER Schools taking Geography seem likely to be almost as plentiful this year as last. They will be held at Cambridge (apply Rev. Dr. Cranage, Syndicate Buildings, Cambridge), at Derby Training College (apply Rev. Canon Bater, The Training College, Derby), at the Royal Albert Memorial College, Exeter (apply Registrar), at Bangor (apply Principal, Normal College, Bangor, N. Wales), at Nottingham (apply Registrar, University College), in connection with the Educational Handwork Association (apply J. Tipping, Esq., 35, Lower Rushton Road, Bradford), and with the Froebel Society (apply Miss Ostle, 4, Bloomsbury Square, W.C.1) There will also be a Summer School in Historical Geography of Europe in Guernsey, conducted by Prof. H. J. Fleure and Mr W. H. Barker ; the work will include a study of the Channel Islands (details from Miss R. M. Fleming, 1, Marine Terrace, Aberystwyth).

IT is best at the present stage of proceedings to inform our members in general terms that discussions with the officers of the Board of Education as to the position of Geography are proceeding fairly hopefully. Sir H. J. Mackinder assisted recently by an address on Geography as a Pivotal Subject in Education, which we are glad to see published in the Geographical Journal for May. A deputation from the Association met several representatives of the Board a few weeks ago, and a very profitable conversation ensued. The thanks of the Association are due to one of its past and one of its, we hope, future Presidents for most valuab'e support on this and on many other occasions.

THE League of Nations Union has formed a Geographical Sub-Committee of its Education Committee and has elected Dr. J. F. Unstead as Chairman of this Committee, a choice that the Association naturally welcomes with special pride and confidence. The Committee is getting to work on sound lines, and will be an invaluable auxiliary to the Association in many ways. Dr. Unstead is to be congratulated both on his address, here published, and on his new book reviewed on another page.

GENERAL LORD PLUMER is characteristically trying to help Malta out of its educational difficulties, and has appealed to the Geographical Association for gifts of any wall maps, atlases, and books that can be spared. If any Universities, Colleges, Schools or Branches of the Association can spare things, will they please communicate with the Central Office of the Association or, if they prefer, send a parcel direct to Lord Plumer by post. Two parcels have been sent, and for large parcels it is advisable to despatch through the Navy to reduce expense. Lord Plumer has arranged that the

Director of Education at Malta shall be a permanent member of the Association, and we venture to hope that this distinguished example will be widely followed.

AN unfortunate slip appeared in the Sheffield Branch Report in our last issue; the word "geology" should obviously have been "geography." We note with interest that the Sheffield Branch is actively engaged in the making of maps, etc., illustrating the life of Sheffield, and wish it success in this Survey work. We hope that at every stage comparison with other places, not in Britain alone, will be encouraged.

THE Bradford Branch is organizing motor tours of geographical interest, and seems to be looking forward to the spreading of this activity far and wide beyond its own local members. It will in this way do a very great service to geography teachers of the country, and it may rely on the co-operation of the Association in its work.

ONE of our Vice-Presidents, Professor Patrick Geddes, has come back to England for a season, and is living pro. tem. at 65, Belgrave Road, London, S.W.1. He comes back after much interesting work in India, discussions of sociology at Bombay, town planning and reconstruction at Indore and many other places, planning for the new University at Jerusalem. We hope that he may come into the work of the Association while he is in England, and would wish to draw the attention of the new generation to the Association's debt to Professor Geddes. From him Prof. Herbertson always said that he drew much of his inspiration, and Dr. H. R. Mill pays his tribute to Geddes in the Herbertson Lecture published on another page. To Geddes, as his old teacher, J. Arthur Thomson has just dedicated his Gifford Lectures, and these are but stray indications of the far-reaching influence of our Vice-President.

MISS COUSER, 398, West Hill Avenue, Montreal, has set herself energetically to the task of promoting the aims of the Association in Canada. Will Canadian readers or those who know teachers of geography in Canada please communicate with her, and so help the new Montreal Branch she has started.

THE Council of the Association asks the Branches and their Secretaries to note the great desirability of interesting students in the Universities and Training Colleges and also pupils in the top forms of secondary schools in the aims of the Association. An occasional branch meeting with programme arranged for the purpose would be very valuable.

MR. F. G. BINNEY, of Merton College, Oxford, asks us to make it known that funds are urgently needed for the Oxford Expedition to Spitsbergen. A large staff is going out very shortly.

MR. FAIRGRIEVE asks us to say that he will be out of the country from May 31st to October 1st. We are glad to hear that he is to lecture during the summer at the University of Chicago. Any queries which would in the ordinary course go to him should come to the Central Office during his absence.

THE Welsh Schoolboys' Camp Committee (Secretary, E. C. H. Jones, B.Sc., University College of Wales, Aberystwyth) asks us to make known its arrangements for providing camps (£2 per ten days per head) in interesting parts of Wales for schoolboys. Letters of enquiry (with addressed envelope for reply) should be sent to the Secretary. As geographers we cannot but applaud this useful effort.

The Ceylon Geographical Association.

THE work inaugurated by Mr L. Mac D. Robison in Ceylon has developed rapidly, and branches have been established at Colombo, Jaffna, Galle, and Kandy. The Colombo Branch, honorary secretary, Mr V. T. S. Sivagurunathan, has now 155 members. Lectures were given by Mr Robison, Professor Patrick Geddes, Mr Bamford, and Mr Denham. In addition, monthly meetings have been held, and a branch sub-committee has drawn up a Syllabus in Geography, which has been forwarded to the Department of Education. Mr J. H. de Saram, the secretary of the sub-committee, gave much valuable help. The Rev. Father Le Goc, chairman of the Branch, has invented a meridioscope, which will shortly be in use in the schools. Mr Denham's address was published in "The Geographical Teacher," Autumn, 1920, and a Scheme of Work in Geography for Ceylon Schools, by Miss Loos, of Mahabodhi College, Colombo, was published in "The Geographical Teacher" for Spring, 1921. Mr V. T. S. Sivagurunathan has also published in pamphlet form a paper on Some Aspects of Modern Geography. This record of work accomplished shows the extraordinary enthusiasm and energy of Colombo geographers, especially when it is remembered that the branch was only inaugurated at the end of March, 1920.

In June the Jaffna branch was established, honorary secretary, Mr Cosmas W. D. Alwines. The branch has now 66 members. Lectures have been given by Mr S. Arulanandam, Mr T. H. Crossette, Miss G. K. Clarke, Mr Bullough, Mr Allan Abraham, and Mr L. Mac D. Robison. The branch is endeavouring to inaugurate a library for the use of its members, and we hope this example will be followed by other branches.

In August a branch was established at Galle, honorary secretary, Mr C. A. V. Brohier. The branch has 45 members, and four discussions on the teaching and study of geography have been given. The Rev. P. T. Cash, the Rev. R. J. Hodges, and the Rev. W. J. T. Small have given much help.

A branch has also been formed at Kandy, honorary secretary, Mr H. W. Mediwake. Fifty-one members have joined, and discussions have been held on the teaching of geography. Plans are being made for geographical excursions in 1921.

The Advanced Atlas of Physical and Political Geography by J. G. Bartholomew—crown folio (14¾in. x 10in), cloth, pp. 96 (maps) x 32 (index), published in 1917—is now issued with an additional full-page coloured political map of Europe after the War. The majority of the maps are the same as in the pre-war edition, but as the colouring is orographical, this is not a serious drawback. The atlas is obtainable in two forms—with index, 12s. 6d. net; without index, 9s. net. Separately, the New Map of Europe, 1s. net per copy. We hope this useful atlas will spread widely through the schools.

The Modern Teacher. Methuen. pp. 272. 10s. 6d.

This is a series of essays on the teaching of English literature, composition, modern languages, classics, mathematics, science, geography, history, citizenship, and morals, each written by a specialist. To the teacher of geography, special interest will attach to the article by Professor H. J. Fleure. This gives a much needed study of geography as a philosophic unity and emphasises the mental disciplines developed by map study. Examples of practical applications useful in teaching are given, and there is a serious study of the proper content of Geography in Education. But many of the other articles are so wide in scope and so modern in tone, that they will appeal to the general reader. In this connection we may quote the scathing criticism of materialistic schemes for continuation schools given by Mr Greening Lamborn in his article on the teaching of literature:—

"Come to school and you shall learn
Extra bobs a week to earn—
(One for you and two for me),
An excellent scheme for Bounderby."

T.C.

The Value of Regional Geography.

(Herbertson Memorial Lecture, 1921).

By Hugh Robert Mill, D.Sc., LL.D.

THOUGH I can say little that is new, I can repeat, with some modifications due to growing experience, a few of the truths which made life worth living to the geographers who founded this Association.

There have been many periods of revival in geography, e.g., in the period of Cook's voyages, the period of the foundation of the Royal Geographical Society in 1830, and that of the last decade of the Victorian era. I ask you now to look back just as far into the nineteenth century as you have advanced into the twentieth.

Forty years ago two independent centres of renewed interest in geography were developing in Great Britain, one of these naturally in London, where the Royal Geographical Society, stimulated by your late President, Mr Douglas Freshfield, broke into fresh activity. An early sign of this was the establishment of the " new series " of Proceedings and Supplementary Papers, another the encouragement of geographical teaching in the public schools and elsewhere. It was then that Sir John Scott Keltie began his long connection with geography by a tour of Europe as a commissioner of the Royal Geographical Society to collect information as to teaching on the continent. He brought back a great collection of books, maps and models, the exhibition of which in various places may be taken as the first stirring of the present advance in geographical education. From the London centre the wave was propagated, not without difficulty, to Oxford and Cambridge, and the persuasive oratory and brilliant generalizing of Sir Halford Mackinder soon justified the efforts of the Society, and the character of the southern centre became definitely educational.

Simultaneously another wave was forming in and spreading from Edinburgh, and of this I wish to speak in more detail, for the facts are less familiar. In Edinburgh the results of the Challenger expedition were being worked out at Government expense. The work was under the direction of Sir John Murray, whose masterful personality could no more be bound by red tape than Samson by willow withes. The Challenger office was a pulsing focus of activity for all the Earth sciences, physical as well as biological, and specialists of every kind from every land met there.

At the University of Edinburgh, two masters of Mathematics and Physics, P. G. Tait and George Chrystal, were drawn into the closest association with the Challenger work. With them co-operated Alexander Buchan, the secretary and the life of the Scottish Meteorological Society and the pioneer of distributional meteorology, and John George Bartholomew, just beginning to illuminate cartography with the light of his geographical genius. Sir Archibald Geikie, with his unrivalled eye for geographical form and geological structure and his inspiring pen, was handing over to his no less gifted brother, James Geikie, the Chair of Geology and the affection of his students, while Patrick Geddes was throwing the glamour of his synthetic mind on the application of geographical principles to social conditions.

The ninth edition of the Encyclopædia Britannica, under the brilliant guidance of Robertson Smith, J. S. Black, and H. A. Webster, and Chamber's Encyclopædia, under the inspired editorship of D. Patrick, strained their alphabetic framework to fit in the new results of the Challenger work as each new volume appeared.

From this gathering of kindred minds sprang in the eighties four important scientific developments—the Ben Nevis Observatory for the investigation of the upper air, the Scottish Marine Station for the investigation of the surrounding waters, the Royal Scottish Geographical Society, and the Outlook Tower and Museum, which, starting as a museum of local geography, became a main factor in the modern town-planning movement.

Research and the applications of research to practical affairs were the aspects in which geography was presented to those students and workers who were caught by its influence, and when the waves from the northern and southern centres met, research and education became common aims to both. It was about the time of that meeting that the GEOGRAPHICAL JOURNAL was established by the Royal Geographical Society, and the Geographical Association had its first humble beginning under the fostering care of Mr B. B. Dickinson and Mr J. S. Masterman.

It is not altogether surprising that following the ancient centrifugal tradition, geographers soon began to pass southward from Edinburgh—G. G. Chisholm to London, J. Y. Buchanan to Cambridge, A. J. Herbertson and H. N. Dickson to Oxford and Reading. It was a time of great ideals, and many of us were stimulated with hopes which now seem extravagant ; but they expressed a driving power and did something. At any rate the recollection of what geography promised then leaves one in the fullest sympathy with the aspirations and the endeavours of the present far more moving upheaval. To me the breakdown of full international co-operation in science means the collapse of a life's efforts ; but to the rising geographers of to-day the new groupings promise an opportunity to be envied. Conditions have changed. If I had not faith in the continuity of the old fundamental principles, I should not be here to offer a tribute to my old friend to-day.

While all the activities were at their height in that now far-off time in Edinburgh, I first met Herbertson, and for a few years we saw a good deal of each other. I remember how useful his help was in working out the calculations of the sea temperature work of the Scottish Marine Station. I recall his interest in the work on Ben Nevis, when he spent some time on the summit of that mountain studying the humidity of the atmosphere. Later he gave a helpful hand in the bathymetrical survey of the English lakes, and on returning from his studies at Freiburg he developed the teaching of Buchan in his important discussion of the monthly rainfall of the land of the whole world. Herbertson's Edinburgh activities culminated in his cooperation with Buchan and Bartholomew in the editorship of the great Atlas of Meteorology, a work which in itself would have made a worthy monument.

At Montpellier, Herbertson had come under the influence of Flahaut, which turned his attention to the mapping of botanical features, so that his early acquaintance with all departments of physical geography was remarkably complete. I think that much of his subsequent success as a teacher, first at Manchester and afterwards at Oxford, was due to this first-hand practical grounding in the fundamentals of geographical science. Nature is only feebly represented even in the best of writings and mapping, and the only effective training for a geographer is to be found in the open—on the sea, the plains and the mountains.

I knew Herbertson best before he went to Oxford, and I remember him as a delightful personality. At once sanguine and serious, he was fired by ambition, but controlled by a modest estimate of his own powers, a man who made friends and attracted students. Circumstances guided him more and more towards education as the field in which he pursued geography, and our paths diverged. His efforts were hampered, as those of all professional geographers in this country have been, by the inadequate financial conditions attached to public offices. If the necessity of supplementing his income gave us the benefit of a series of valuable text-books and readers, I cannot help feeling that it deprived us of the mature results of his early studies and researches. This is the more to be regretted because while a member of the

Royal Commission on Canals he had obtained insight into the practical side of geography as it affects the engineer and business man, a valuable supplement to scientific and academic experience.

There are many here who knew Herbertson as a professor better than I did; but there is no one who appreciated more fully than I do his high character, his early enthusiasm, and his later successes.

I do not think I am wrong in viewing as one of Herbertson's more notable services to geography in this country his insistence on regional study, laying stress on the association of the facts of geography with the diverse conditions of a particular portion of the land surface. There has been a tendency to treat geography from the point of view of world-wide distribution. This is right enough in itself, but becomes wrong when the conception of scale is left out of sight and a partially instructed exponent attempts to apply general facts to particular cases or places. As an example, there is no better established general fact than the existence of the Brave West Winds of the Roaring Forties. But it is wrong to make the dogmatic generalization that a west wind always blows in those latitudes. One must remember that the sum of phenomena, the average of which yields a general law, is an algebraic sum, so that while one can argue quite accurately from the particular to the general, one cannot do so with the same certainty from the general to the particular. Wise folk veil this irreversible process by talking of "prevailing winds," that is, winds which blow most days, but not every day; and this illustrates what I have come to recognise as the prevailing weakness of popular exponents of geography and of all other things as well.

I lay stress on the importance of regional geography as the foundation of general geography not because it has always been ignored, but because there is a tendency, especially perhaps amongst teachers, to prefer the discussion of general laws to the classification of demonstrated facts. If we had not in view the clear formulation of general principles embracing and explaining all phenomena, the pursuit of any science would be a soul-less task; but no general principles are worth formulating unless they are based on clearly established facts. In geography such facts must be established by observation and measurement, and the interaction of mutually dependent facts must be studied for each particular region, before we need look for the unifying principles which will establish a general geography.

A SCHEME OF REGIONAL GEOGRAPHY.

I shall devote the remainder of this lecture to the consideration of how regional geography may best be studied, and I should perhaps apologise for basing it mainly upon my own experience. Long ago it seemed to me, rightly or wrongly, that many of the wide generalizations common in books of geography depended on a basis of probability rather than of fact, and that this was the case in particular with the theories of the influence of environment on human life. The idea was crystallized when in 1896 the editors of Knowledge asked me to write an article on Geography in the Victorian period. To mention the Victorian period now is usually the occasion for sneering at a time that is out-of-date and rather ridiculous; but then it was an excuse for glorying in the almost incredible advances which had carried human knowledge almost to the zenith of historical possibility.

I referred in this article to the great mass of information which had been obtained as to the surface of the British Isles by a multitude of Government departments during a long series of years, but had never been brought together in the form of a geography of the British Isles, which I thought "would form, if properly carried out, the greatest geographical work of the coming century."

The idea was so attractive that later in the same year I submitted an ambitious scheme to the Royal Geographical Society* for a complete description of the British Isles based on the one mile to one inch map of the Ordnance Survey, and taking account of the work of the Geological Survey, the Admiralty survey, the Meteorological Office, the Board of Agriculture, the Board of Trade, the census returns, and supplemented in certain directions from special surveys or studies. The suggestion was made to prepare a memoir for each sheet of the map, treating each in a precisely similar way, and ultimately combining and condensing the information into a series of regional memoirs, each treating of a definite geographical unit, and finally condensing and summarising the whole into a single volume dealing on a proportionally reduced scale with the whole United Kingdom. I anticipated important practical applications for such a geographical study, laying stress on the possibilities it would reveal for the utilization of water-power, for afforestation and agricultural development. But I had the intelligence to own that the project was only " a seductive dream."

However, it attracted some attention, and I prepared a sort of estimate of the extent of the work and the time it would take to accomplish, viz., 20 volumes of about 1,000 pp. and twenty years. Had it been undertaken and had the estimates proved accurate, the work would have been almost finished before the war broke out. If that had been so, the total cost could have been saved ten or a hundred times over in the prevention of waste on aerodromes on impossible sites, or attempts to cultivate land unsuited by its nature for agriculture, and by the utilization of water-power to conserve coal; to mention only a few of the applications to which it might have been put.

The scheme did not go through. In accordance with the wish of the Council of the Royal Geographical Society, a specimen memoir was prepared for Sheets 317 and 332 of the one-inch ordnance survey map,* or I should rather say an attempt was made to prepare such a memoir, the success being limited by the impossibility of dealing with an isolated instance without machinery that once provided would have sufficed for turning out a large series on a uniform plan. Thus, although the earlier stages of the work were complete enough to have stood as part of the scheme, the later parts were merely illustrations of how the completed work should shape.

The mathematical and physical aspects were pretty fully dealt with, giving a complete statement of the position, mean altitude, and surface configuration of the land, as these were laid down once for all by the Ordnance and Admiralty surveys. The ideal physical map of a natural region should represent these features and no other—no roads, woods, houses, towns, parish or county boundaries, nothing but the naked surface of the land. The only lines permissible on such a map are contours of altitude, streamlines, watershed lines, and, like the shadow of a fine spider web, the degree net proper to the map projection. To obtain such an ideal physical map from the Ordnance Survey publications means a process of stripping away nearly all the work that makes a map worth anything to the public which uses maps for practical purposes. To understand a district from the point of view of a scientific geographer, this stripping is most useful. From the theoretical point of view the broad outlines of the geology might perhaps come first. The order is arguable. I believe some artists have begun a picture by first painting the skeletons of the people represented, then painting over the bones the nude forms, and finally painting the draperies, which alone are present to the eye in the final picture. Other artists, I believe, omit the skeleton except in so far as its forms are visible in the figure. I am of those geographers who leave to geologists, the anatomists of the Earth, the study

*Geographical Journal, April, 1896.

*Geographical Journal, March and April, 1900.

of the bones and their articulations, except in so far as these affect the surface or explain its forms. So I would describe the nature of the soil and the order of the rocks after having made a clear picture of the actual configuration of the surface

The next condition to describe is the effect of the atmosphere, and here we pass from static to dynamic geography, from the solid forms of the land to mobile distributions. Here we pass, too, from the definite results of surveys which, save for revision and correction, are complete and final, to conditions which are ever shifting and have been investigated only partially, if at all.

In geography we may take it as an axiom that what cannot be mapped cannot be described, and we must recognise also that if we take a sufficiently small portion of the surface we may find nothing to map. In any six-inch map of uninhabited country there are many square inches of blank paper, between the contour lines where the slopes are very gentle and the surface bare. So although it is easy to draw isobars and isotherms on a map of the British Isles, the data available do not always suffice to do so on a single one-inch sheet, and even if the data were there, the whole sheet might haply fall between two isopleths. Hence a general statement has perforce to take the place of detailed description ; but it is not so with regard to rainfall. Data of 18 years' average rainfall at 27 stations situated in the sheets dealt with were supplied by the British Rainfall Organization, then presided over by its founder, Mr G. J. Symons, and from these a rainfall map was constructed, which I now see to be imperfect in many respects ; but it is quite representative of the type of distribution and served its purpose well.

Next came the problem of the vegetation, and here no maps were available, such as those of plant associations which have been made by various experts for various parts of the country. In the conditions of time and assistance all that could be done was to deal with the agricultural returns, which are only published in total acreage for counties for each year. The Board of Agriculture generously gave access to the parish totals for a particular year, on condition that the figures should be re-grouped in larger areas before publication, as the returns from individual farmers are confidential, and to publish parish figures might enable the curious to guess at the produce of the larger farms. They were grouped according to the main geological characters (here only London clay, chalk, and the lower clays and sandstone) in five groups according as the parishes lay wholly on beds lower than the chalk, wholly on the chalk, wholly on beds higher than the chalk, or partly on chalk and lower beds, or partly on chalk and higher beds. The classification was crude and adapted only for the particular region ; but it would have been very helpful if average results for many years could have been worked out ; still more if groups for different successive periods of equal length could be calculated and compared.

The next step was to deal with population, for which the returns of successive censuses afforded abundant data. An approximate population map was prepared by simply blacking in the areas of towns and villages, as shown on the one-inch sheet, and transfering these to a tracing, on which each isolated dwelling was also shown by a dot. A line was then drawn enclosing the completely uninhabited areas which lay more than quarter of a mile—of course an arbitrary assumption—from the nearest dwelling. The general census results for parishes and the Registrar-General's statistics were then discussed.

Mineral resources being of little importance in the district and traffic small, the Board of Trade figures were not made use of. However, a great deal of anthropogeography came in with the discussion of the sites of villages and towns, the roads and railways, and the whole attempt concluded with a complete index of place-names.

I wish to make it clear that the "Fragment of the Geography of England" was only a skeleton of what the complete geographical description aimed at being. The scheme was well received, but came to nothing. It has been taken as a model for exercises in regional description by geographical students. I do not think, however, that this was quite a fair use to make of a plan in which the detailed description was only a first step.

The difficulties in the way of carrying out the original scheme were far greater than were suspected when it was proposed; but experience suggests that ignorance of the difficulties ahead is a help rather than a hindrance to the formulation of any new enterprise. As a rule difficulties can be met and dealt with as they arise, even if their magnitude has not been foreseen.

THE RAINFALL MAP.

Circumstances led me to the opportunity of working at one small part of the great plan, namely, the relation of rainfall to configuration of the land, and perhaps the best service I can render to students is to show, if I can, the real nature of this very simple problem in geography.

I view geography as the science which deals with the forms of relief of the Earth's surface, and with the influence which these forms exercise on the distribution of all other phenomena, or, less precisely, as the influence of configuration on mobile distributions.

The particular case in hand is the influence of the configuration of the British Isles on average annual rainfall. The Ordnance Survey supplied all necessary facts as to configuration expressed in the continuous flowing contour lines which generalize the results of all levelling operations, thus furnishing the basis for the rainfall map.

Some experiments in mapping the rainfall of individual very wet days contradicted the facile assumption that surface relief controlled the distribution of such falls. On a wet day the wettest places were sometimes on the high land facing the prevailing wind, sometimes on the low land most sheltered. Experience of mapping monthly totals of rainfall revealed a general but by no means a regular distribution of rain greatest on the high lands and least on the low; and the mapping of individual annual totals showed a general identity of distribution, though the value of the isohyetal lines represented varied from year to year. It took the work of some years to show clearly that rain falling in thunderstorms and in cyclonic disturbances of comparatively small size was distributed on the whole in accordance not with geographical but with meteorological conditions, and was probably determined at heights considerably greater than that reached by any part of the land. Reasoning showed that the rain-fields of such heavy falls might occur over any part of the land and probably over any part of the adjacent sea, according as the track of the atmospheric disturbance producing it happened to run. It was fair to assume that in a year heavy falls would occur in many parts of the country and in a great number of years in all parts of the country, so that in a map of absolutely normal conditions rain of this type would show a uniform depth over the whole surface; in other words, it would only affect the numerical value of the isohyetals, leaving the form of the isohyetals to be determined by rain of a non-cyclonic or non-thunderstorm origin.

In order to see what this distribution actually was, a map was prepared from 380 stations with rainfall averages of 30 years.* These were not so uniformly distributed as one would like, but when plotted on a blank map with no orographical features shown, the data yielded isohyetals showing a startling similarity to the contour lines of elevation on the same scale. There was no doubt that, on the average, the distribution of rainfall was determined by configuration. It is a meteorological rather than a geographical matter to explain the apparent anomaly. Still I may say that it arises from the fact that the ascent of moisture-laden air produces rain ; when this occurs from a meteorological cause independent of the land surface, the resulting rain falls on the ground, be it high or low, which happens to be under the rising mass of air. But when the air is flowing in from the sea or across low land in a practically horizontal sheet, it must be forced upwards on reaching the hills by the surface of sloping land acting like a wedge. As the air rises the rain falls, the amount depending on various factors, amongst which the slope of the land is of great importance.

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*Min. Proc. Inst. C.E., Vol. 155 (1903-4), Pt. I.

It is clear that the direction from which the wind comes is very important as a factor of rain distribution, for land rarely presents the same slope to all sides. In the few cases of heavy rains occurring with westerly wind and straight isobars, which mean a current of air from the prevailing direction without cyclonic uplift, the map of a day's rain is strikingly similar to that of a normal month or a year, thus indicating the predominance of horizontal winds on the average of a year or of many years. To precipitation of this type the name of orographical rain has been applied.

So far a general study of rainfall in any large area would lead to the same result ; but when we attempt to give a quantitative value to the influence of wind-direction, land slope, and altitude, detailed study of a particular region is essential. The conditions for such study are very onerous. The region must be studied not only from maps, but on the spot. Rain gauges must be established at fairly close intervals and read under skilled supervision to avoid errors. Methods must be found for computing sound averages, so that the means of irregular periods may be compared safely, and every step of the work must be rigidly checked so as to stand the sharpest criticism. It is not too much to say that unless the result of the work was of great and urgent practical importance, these conditions could never be met. The way they have been met has not been set out fully in public before.

In this country the law provides that no scheme for water supply can be carried out by any company or public authority without the sanction of a special Act of Parliament, which is promoted by what is called a Private Bill. There are various forms of procedure, but normally each Private Bill is examined by a Committee of each House of Parliament separately, a member of the Parliamentary Bar states the case of the promoters before the Committee, and anyone who has reasonable cause to anticipate that he may be injured by the provisions of the Bill, then states his objections through counsel, after which the Committee decides whether to recommend Parliament to pass the Bill as it stands or after amendment, or to reject it. Expert witnesses who have previously given reports on which the Bill has been framed or by which it is attacked are called before the Committee, examined by an eminent King's Counsel and cross-examined by another, or by half a dozen others, in the effort to shake the evidence. This is a very different test of the validity of scientific deductions from the discussion that takes place after a paper has been read at a scientific society, and I have never known any keener incentive to thorough preparation and clear exposition. As in all the great Water Bills of the present century, the amount of water available on the ground selected has been determined by means of an average rainfall map specially prepared by the Director or Superintendent of the British Rainfall Organization, the promoters have naturally supplied every facility for obtaining an accurate map. And as in every case this map has been compiled so as to fit the maps of adjoining areas, a large part of the country has been dealt with. A large part of the country was also mapped with exactly the same precautions for the Water Supply Memoirs of many counties which were published by the Geological Survey, and when I was obliged to stop work, practically half of the area of the British Isles had been covered by an average rainfall map on the scale of 2 miles to 1 inch.

I have laid stress on the economic and legal environment in which the work was done, as I think it is unique for any piece of scientific research. In many cases an increase of one inch in the estimate of average annual rainfall would mean an increase in the cost of the necessary engineering works of £10,000 at pre-war rates or anything up to £30,000 at present prices. On the other hand, if the estimate were made a few inches too low, it might mean the abandonment of the only reasonably cheap source of supply for a great city. Between two such burdens of responsibility one can only look straight forward, aiming at the highest possible accuracy; for in such work one cannot seek refuge on "the safe side," as each side of the truth is beset with its own dangers. The tradition established under such sanctions will, I trust, hold under the Air Ministry until the average rainfall map has been completed by the Rainfall Organization for the whole area of the country.

When trying to construct a rainfall map of high accuracy, one longs for the ideal physical map as a basis, but one must be content with the best available. At present there are not enough rainfall data in most parts of the country to justify the use of so large a scale as 1 inch to 1 mile, though we were able to use that scale for the Lake District of England. In most cases 2 miles to 1 inch is a suitable scale, and for most parts of the country nothing could be better than the Ordnance Survey layer map of that scale. This map is disfigured by the crude green patches representing woodlands, but otherwise its colouring is strictly consistent, the same tints being used for the same ranges of level in all parts of the country. Unfortunately in practical life absolute consistency often lands its practitioner in difficulties, and here the slight contrast between successive tints gives a somewhat flat aspect to many districts where the change in level is gradual. Bartholomew's half-inch layer map, the forerunner of the official issue, is free from this defect, as the range of colours is varied so as to ensure effective contrast, and in practice I have used whichever map happened to be the more convenient for the district under study.

The computation of correct averages for each rainfall station is complicated and difficult; but as it is not a geographical point I pass it over. When the figures have been placed on the map, each on the site of the rain gauge which furnished it, the geographical part of the task begins. The interval between the successive isohyetal lines shown depends largely on the scale of the map. For the half-inch scale I have found 5 inch intervals always practicable except in regions of very high rainfall and rapid change; in regions of lower rainfall it is often possible to have smaller intervals, and I have then used 2½ inch steps.

Having before one a half-inch layer map, with all the available average rainfall figures which have emerged from the statistical tests (not referred to here), the problem is reduced to drawing the isohyetal lines for the adopted intervals. If the figures were arranged uniformly over the map, say at intervals of an inch each way, it would probably suffice to fix the position of the isohyetal between each two figures by a dot which divides the distance proportionally as judged by the eye, and then to connect these dots by lines. But even in this impossibly simple case the question of curving the lines must be considered. To join the points by straight lines would be absurd, for straight lines so rarely represent any natural feature on the surface, that without strong corroboration they cannot be accepted as correct. Since height above sea-level has been shown to have a close association with increase of rainfall, the assumption that the isohyetals should be drawn generally parallel with the contour lines is natural; and the study of an actual map—which happily has usually some places where figures cluster closely, as well as many where they are deplorably wide-spread—abundantly justifies this assumption. The clustered figures give the clue to the general run of the isohyetals, even although they define only a short stretch at a time; and by applying the relation between contours and isohyetals demonstrated in the clustered portions to the thin places, it is possible to stretch a probable line along a great part of the map. By long practice one acquires an almost instinctive insight into the sympathy between isohyetals and land forms. One learns to refine upon the first crude approximation of parallelism and make allowance for the gradual climbing of the isohyetals from contour line to contour line along slopes which run in the direction of the prevailing wind. Faith in the relation which has gradually emerged is justified by the fact that sometimes a series of records is discovered which were unknown when the map was drawn, and the new figures are found to fall as neatly between the isohyetals as if they had been the original data from which the lines had been drawn.* One may be impelled to sketch in lines on blocks of country where no observational data exists, and even to conjecture what the maximum rainfall on an un-gauged mountain top may be ; but this is a dangerous game. A tailor may venture to cut out a coat for an unmeasured customer, and might even put together a garment which might be near enough to try on; but at the very best he would require a lot of tearing asunder, letting out, and taking in, before the coat would fit. Even a measured coat takes some fitting, and the best measures for a rainfall map are very far from being comparable to a tailor's measurements, so that a vast amount of re-adjustments must be expected before isohyetal lines sketched without numerical data can fit the land.

One must always be on the alert not to allow theoretical considerations, which are so helpful in the absence of tested data, to tempt one to disregard actual figures even when they seem to be contradictory. It is true that bad figures can be detected by their disagreement with the majority of the figures around them; but they must not be disregarded on that account until a statistical investigation or an inspection of the rain gauge responsible for them shows that they are untrustworthy.

In mapping the rainfall on the slopes of a uniformly rising ground, such as the western face of the Welsh mountains or the Lake District or Bowland Forest, one becomes so accustomed to the uniform increase of rainfall with height, that when one finds higher figures in the valleys to the east it is disconcerting. In many cases, however, there is no getting over the fact that places a few hundred feet above sea-level have higher rainfall than places a few thousand feet above sea-level to windward of them, and the isohyetals must be drawn to fit the facts. This is the case at the Stye below Styehead Pass in the Lake District, in the valley east of the Black Mountain in Monmouthshire, and at a great many other places, even where the orography is as gentle as in the case of the North and South Downs.

The explanation leaves the general principle of the influence of configuration on average rainfall not shaken, but strengthened. In part it is due to the bodily transport of sheets of rain over the ridge by high wind before the drops have time to fall, and then the phenomenon is accompanied by a lower recorded rainfall on the hill tops than their elevation and exposure would suggest. But in part it is accounted for by the continual progress of the air blowing along the windward hill-slopes upward as well as onward, so that increased precipitation induced by the high altitude drops into the valley on the other side, in the same amount that would have fallen on the hill if it had continued to run up to the height reached by the wind shooting beyond its summit. There are indeed some instances where the amounts of rainfall observed are at variance with the relationships which prevail in adjoining localities, and these are problems of promise for future investigation.

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* See *British Rainfall*, **1915**, p. 29.

Meanwhile I may quote the general principles arrived at some years ago,* as I think they will stand the test of time :—

1. There are no abrupt transitions in average rainfall.
2. The rainfall on the windward slope of a hill increases from the lower to the higher levels, although not necessarily at a uniform rate.
3. The rainfall on the leeward slope of a hill is frequently greater at some point on the slope than it is at the summit.
4. When two portions of land of similar configuration have the same exposure to the prevailing wind, the distribution of rainfall is similar.

Mr. Salter has gone somewhat further in discussing the work which we have carried out together, with a view to assigning numerical values to the relation between configuration and rainfall.* The result will be that as research continues and experience instructs, the compiler of such maps will be enabled to draw his lines firmly on the basis of sparser data than could be trusted formerly. I hope, also, that as time goes on, the number of observations will increase in the bare patches, so that eventually a really complete representation of the distribution of rainfall may be cast like a garment (and like a perfectly fitting garment) upon the naked land.

No attempt has yet been made to plot the rainfall of individual months or years on large scale orographical maps ; but this promises results of the deepest interest if carried out for regions where rainfall stations are numerous and in conjunction with data regarding winds.

A WATER GEOGRAPHY.

The mapping of average rainfall is not a matter of academic interest merely, but one of high public importance. It is an essential step towards a complete water geography of the country, which has become an urgent necessity. The vital importance of the water resources of a country has hitherto nearly escaped general attention. The enormous quantities of water required for the supply of populous areas have in the past been obtained easily from deep wells or from conveniently situated moorlands. Canals, which absorb an immense volume of water in working the locks, have been allowed to become an insignificant element in our transport system, and our vaunted supplies of cheap coal have kept the eyes of manufacturers averted too long from the possibilities of water-power. But the old happy-go-lucky days are over. The most convenient moorlands have all been utilized or pegged out by far-seeing communities, and many a municipal brain is sorely worried to find new gathering grounds. The deep wells have to be deepened every year to keep pace with the sinking level of the reservoir of underground water. There is a talk of reviving the canals ; there is a new and urgent call for condensing water for the great electric supply systems now being established, and with the growing price and scarcity of coal, the need for water-power and the possibility of its economic installation are being forced on the mind of the public.

We know enough of the rainfall to be certain that enough water is always pouring down upon this country to satisfy all demands that need to be made on it ; but its natural distribution has to be studied, and its use requires to be controlled so that the best return can be obtained from each river-basin. We require to ascertain exactly how much water can be counted on for continuous supply throughout the year—a physical question—and what communities are to be served from each gathering ground—an economic and political question of extraordinary complexity, for the use of water by one community must not be allowed to prejudice the claims of other communities near or remote. It is on account of the complexity of the problem that the terms of reference of the Water Power Resources Committee of the Board of Trade have had to be widened to include an enquiry into all uses of water.

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* *British Rainfall,* 1915, p. 28.

* Proc. Inst. Water Engineer, 23 (1918), 45-9; and *British Rainfall,* 1918, pp. 40-56.

The natural unit for a water geography is, of course, the river basin, or, as engineers often call it erroneously, the watershed. An ideal physical map of any British or Irish river basin could be prepared from the Ordnance Survey sheets, by a few additions. First comes the insertion of the watershed bounding the drainage area, which can be sketched in easily enough on a small scale map; but seldom on the one-inch scale without occasional reference to the country itself, and there is probably no more difficult task in surveying than fixing the watershed on a six-inch map of a flat-topped moorland. Another desirable addition is the fixing of levels at various points in the bed of streams, and this is of vital importance if the map is to be taken as a guide to water-power, for the power of a given weight of water depends entirely on the distance through which it falls. A correct profile of a river bed cannot be drawn from the contours as shown on the ordinary map, and it is very important to be able to set out the vertical fall of a river bed in this way. Now bearing in mind how the configuration of the land ensures that the heaviest rainfall descends on the head waters or torrential portion of a river, one sees that this is the region where most power can be generated, taking advantage of the high falls; and here the natural untamed power of the falling water has done most work in carving out its deep and steep-sided ravines. Lower down the valley the course of the river has a gentler gradient, but still sufficient to ensure a rapid current, and as the waters converge upon it from many torrents, the increased volume of water secures a great source of power due to large volume with a low fall. The valley course of a river is habitable and cultivable in opposition to the desolate and barren torrential track, and here in the earlier days power was first used. Throughout this section the river carries along stones and sand, and too often it is compelled also to carry a load of sewage from the towns it passes. Farther down, in the Plain course, the typical river winds with reduced gradient and falling velocity, slowly towards the sea. It can no longer transport heavy matters, and drops its load of silt, ever reducing the gradient of its bed and the speed of its flow. The practical problem here is how to get the water to pass along fast enough to prevent the flooding of valuable agricultural land along its course.

As every river differs from its neighbour in the relative lengths of the three typical divisions of its course, each river-basin must be studied geographically as a separate unit. The rainfall map tells only how much water falls on the different parts of the surface in an average year. Special investigations are required to ascertain how much water flows off the surface and occupies the river-bed at each point, how much evaporates and returns to the air, and how much percolates through the soil to replenish the deep-seated reservoirs of underground water. A hydrometric survey is necessary for this purpose, with special gaugings of river-flow at important points. But in order to understand the ratio between run-off and percolation, it is necessary to take account of the geological structure and the nature of the rocks and soil, for there are all grades of permeability, from the smooth walls of the highland schists, which shed practically the whole of the rain into the rivers, to the waterless surface of the chalk downs, where every drop that falls is absorbed into the porous rock. More, it is necessary to consider the covering of vegetation and the result on evaporation, run off, and percolation; of bare stone surfaces which throw all the rain off at once; or of spongy peat mosses, which may absorb a week's rain after a long drought, and ooze out a uniform supply to the stream for weeks thereafter.

Equally marked is the contrast in the effect of grass, and still more of trees in summer, when the transpiration of water into the air is enormously accelerated, and the thoroughly drained agricultural land, which rapidly withdraws water from the surface and passes it on free from evaporation by shallow springs to the streams, and by deeper channels to the underground stores.

From the scientific view-point of the geographer, the main interest of a water geography is that it describes a circulation in which water is merely a medium for transforming solar energy into work or the potentiality of work upon the Earth's crust, which guides the working of the system. But to the engineer or other practical man the interest lies in controlling the energy, so that the amount available for generating power or supplying cities may be calculated, and due provision made for maintaining navigation in the lower stretches, maintaining free passage for fish when these are of economic importance, and preventing floods and placing no impediment in the way of land-drainage or of the carrying away of any deleterious substances that may be allowed to enter the lower reaches. From this point of view a complete water geography would amply repay the cost of compilation, and the Second Interim Report of the Water Power Committee of the Board of Trade recommends such work as one of the functions of a Central Commission for the Control of Rivers, the appointment of which is urged.

Memoirs on water geography could not be compiled for any river-basins by taking account merely of the forms of the land, its geological nature, the vegetation, and the amount of the water.

No complete scheme could possibly leave out of account the industrial processes which have been set up on the streams or in the valleys, the sources of power for factories involving the relation of the stream which supplies condensing water to the nearest supplies of coal and iron, the railway, and road communications between them, the grouping of population and its migrations, the political divisions into rural and urban districts, boroughs, counties, and numerous joint authorities with their intersecting and overlapping jurisdictions.

In fact, the compilation of a rainfall map, which was undertaken as a refuge from the bewildering maze of a complete regional geography, leads back through the portals of a geography of inland waters to something very like the old 1896 scheme.

The practical question of providing the machinery for producing regional geographical memoirs, or the more specialized memoirs on river basins, presents many difficulties. If it is to be attempted by any Government department, the scope and treatment will necessarily be influenced by the immediate purpose in view. Hitherto men of science have often been dissatisfied with the researches carried out by government departments, not because there are not able men employed on them, but rather because the wider aspects of the work are under the control of Ministers, who are not, as a rule, instructed in scientific methods or in sympathy with the scientific spirit. The regional memoirs would require co-operation between many departments—at least the Ministry of Agriculture and Fisheries for the Ordnance Survey and other things, the Admiralty for the Hydrographic Survey, the Department of Scientific and Industrial Research for the Geological Survey, the Air Ministry for the British Rainfall Organization, the Ministry of Health for Water Supply, the Board of Trade for Water Power; and in each case the particular subject named forms a mere fraction of the work of the Department in question, while the head of each Department may change every few months. Had the opportunity been taken when a Scientific Research Department was established, to bring under it all the surveys to which I have referred, it would have been possible to have a co-ordination between the various branches of Earth science which would have greatly strengthened each of them; but that opportunity was lost. I am full of admiration for the ability and devotion of the high officials placed in control of each of the scientific activities I have named; but they are all hampered by the system of which they form part, and all are responsible to chiefs whose main interest lies in a different direction. Hence it is, in my opinion, unlikely that we shall find either the freedom or the incentive necessary for successful original scientific work in the existing departments.

It seems to me that its natural home would be in some University or kindred institution, where a Professorship of Geographical Research might be founded as soon as a sufficient number of trained geographers have been produced to compete worthily for the post. It should be equipped with ample and unconditioned funds, provided, perhaps, by the not impossible millionaire who may desire to possess the remainder of his wealth with an easier mind. Data should be sought from all sources; but worked up only by trained geographical students, each adequately paid, subject to summary dismissal if inefficient, and open to promotion if able and eager to take advantage of his opportunities. There should be no haste to provide showy results, no cessation in the search for fresh facts and better methods. Research and teaching go hand in hand, and practical application is a helpful companion to both. Hence I should like to see the institution I have in mind closely associated with instruction in engineering, forestry, and agriculture, so that those whose business it is to make use of natural resources, should have the fullest and most stimulating education in the theoretical as well as the practical foundations of their calling.

But I fear that I am indulging in seductive dreams again.

Summer School in Guernsey, C.I.

Tuesday, August 9th, to Friday, August 26th, 1921.

(Lectures to begin on Wednesday, August 10th, at 10 a.m., in the Queen Elizabeth's College, Guernsey).

A course of lectures on the Historical Geography of Europe and the new problems will be given by Dr. H. J. Fleure, Professor of Geography and Anthropology, University College of Wales, Aberystwyth, and on "The Effects of European Industrialism on Extra European Countries" by Mr W. H. Barker, B.Sc., of Southampton University.

Special attention will be given to Excursions, and short lectures bearing on the Regional Study of the Islands.

The lecture fee will be £3 3s., and this should be sent on or before the 1st of July, 1921, to Miss R. M. Fleming, 1, Marine Terrace, Aberystwyth. All cheques and postal orders should be crossed "Lloyd's Bank, Aberystwyth."

Students are SPECIALLY ASKED to notify their intention of attending the course to Miss Fleming at AS EARLY A DATE as possible.

ACCOMMODATION.—Students will be personally and entirely responsible for accommodation arrangements. But as Guernsey is often crowded in August, arrangements have been made that places shall be reserved for some of our students at Mrs White's Boarding House. Terms:—10s. 6d. a day for board and accommodation; baths and afternoon teas extra. Students who wish to take advantage of this arrangement should write AT ONCE to Mrs White, Homelands, Le Febvre Street, Guernsey, C.I., heading their letters "DR. FLEURE'S SUMMER SCHOOL IN GEOGRAPHY," and enclosing a stamped addressed envelope for reply. Mrs White has kindly undertaken to pass on letters of application to other houses if she is full herself. She will be glad to know of students willing to share a room.

A Guide to Guernsey, with map and advertisements of accommodation and rail and boat details, may be obtained from the Secretary, Chamber of Commerce Advertisement Committee, High Street, Guernsey, C.I., for 3d.

Students sending enquiries to Miss Fleming MUST enclose a stamped addressed envelope for reply.

The Evolution of the South-West.

By W. Stanley Lewis, B.Sc., F.G.S., F.R.G.S., Lecturer in Geology and Geography, University College, Exeter.

THE purposes of this paper are two in number :—

(1) To give a brief account of the evolution of the region, bringing out the physical controls.

(2) To stimulate interest in an area which affords unique opportunities for, and which will amply repay, painstaking research.

For convenience of consideration, the " South-West " is taken to mean Devon and Cornwall. This assumption, while open to criticism geographically, possesses the sanction of popular opinion. Although its glory has departed, yet the sound traditions and past influence, combined with its present position as one of the nation's chief sanatoria and pleasure grounds, afford justification for a detailed consideration. Further, it is a region affording boundless opportunities for research. Volcanic debris, but little evidence of the original volcanoes ; mature and ungraded rivers ; all types of geological formation—these are a few of the physical aspects, and whatever the point of approach the possibilities for the regional geographer are equally wide.

GEOLOGY—PHYSICAL STRUCTURE, ETC.

The dominating feature of the peninsula from the geological standpoint is the granite axis. So obvious is the influence exerted by the igneous outcrops that there is a tendency to consider them otherwise than in their chronological relationships to surrounding strata—a procedure productive often of misconceptions. They will, therefore, be here considered strictly in their time order, their control being emphasised later.

Treating the area broadly, it may be termed Palæozoic in age, with the exception of South-east Devon and occasional isolated patches elsewhere, e.g., the St. Erth beds and the Bovey lignites. The occurrence of such patches points to the extensive action of denuding agents.

No reliable information regarding Archæan time is available. Possibly the rocks of the Lizard and Start Point areas may belong to this period, but they are so metamorphosed that their origin is obscure. A similar uncertainty prevails over Early Palæozoic or Protozoic time. Cambrian formations are absent, but west of line from St. Agnes Head to the Dodman Point undoubted Ordovician strata are evident. From this time until the Devonian era the geological record is very imperfect, and much research is necessary before the stratigraphical relations of the West Cornwall area can be correctly interpreted.

The closing of the Protozoic era was marked by a shallowing of the sea, the general eastward encroachment of the North Atlantic continent, and the initiation of a series of foldings, crushings and crumplings which gave rise to the mountain masses of Scandinavia, Scotland, and Ireland (Donegal), trending generally north-east to south-west. At the conclusion of this activity our area probably lay beneath the waters of a strait which connected a large gulf to the west with the open sea on the east. Of the whole, only the mass west of the St. Agnes—Dodman line was land, with the possible exception of an island group on the site of the Start Point area. In this off shore position were laid down the Devonian grits and rough slates that are so characteristic of North Devon and Cornwall. As the continental rivers became graded the detritus became finer, and later failed to reach the more distant areas, where, in the clear water, coral reefs formed—the limestones of South Devon. Coincident with their appearance was the outbreak of volcanic activity, resulting in the production of islands. The climate of this period (in those portions of Britain which formed part of the continent) resembled closely that now existing in the hot deserts of Asia. With the progress of Devonian time the sea encroached upon the eastern continental margin, monsoonal conditions arose, and towards the close the conditions approximated to those of the Eastern Asiatic coast, Devon and Cornwall being represented as a fringing archipelago.

A series of slow oscillatory movements commenced with the advent of carboniferous conditions. The physical conditions of this age are well known. Apparently Devon was too far from the coast to permit the formation of "lagoon beds," with the result that coal measures are generally absent, their place being taken by cherts, limestones, shales and grits, locally known as culm. The effect of this distance from the coast upon the history and development of the region during historical time is extremely far-reaching. At the close of this period came the Armorican upheaval, which is responsible for so much of our British scenery. Stresses acting from the south pushed the accumulated sediments againt the rigid Caledonian system of highland, and produced a land mass comprising a series of folds, striking east and west, of which the Mendip, Exmoor, and the granite heights of the peninsula are some of the remains. Reflex crustal movements gave rise to the Pennine system, striking north and south, evidenced in Devon by the Haldons and a series of minor heights to the north of Exeter, e.g., Stoke Hill. During the middle and later periods of this era of movement, Dartmoor was probably the site of a series of active volcanoes. To this movement belong the granite intrusions that have so profoundly affected the contour, life, and development of the peninsula. It is fairly certain that granite forms the core of the Exmoor ridge, for it forms a large portion of the detached outlier of the ridge, Lundy. The Exmoor fold produced in Devon a narrow geanticline that is continued eastward by smaller ridges, ultimately passing via the central axes of the Weald across into Europe. The anticline of South Devon is better known as the "Purbeck," owing to its marked influence in the Isle of Purbeck. It strikes across from the Isle of Wight to Bude, and is broken by the granite outcrop. It is possible that the supposed Archæan masses of Start Point and the Lizard mark the trend of another of these parallel folds. The granite is doubtless due to the injection of molten matter into the domes resulting from the uplift, and in the Dartmoor area has cut obliquely across the anticlinal axis.

For a long period following the upheaval, desert conditions prevailed over the area. Situated on the east of a great land mass and cut off by mountain systems from the westerlies, rainy seasons were of rare occurrence. Occasional torrential downpours gave rise to the Permian breccias of the Crediton, Exeter, and Dawlish districts. With these are associated unique types of lava that bear witness to the violence of the earth movements that produced the mighty Armorican ranges. Following upon these come the sands and marls of Trias age, laid down in a huge inland lake, by the shores of which wandered the Labyrinthodon. Evidence of the saline nature of the lake can be found on the Sidmouth coast, where the marls show veins of gypsum and pseudomorphs of salt cubes. Into this area of inland drainage, during early Triassic time, poured rivers bearing large pebbles. The chief was that which, coming from the south (France), laid down the bed now known as the Budleigh Salterton pebble bed.

Until Jurassic time, little change appears to have occurred in the area beyond that occasioned by denudation. This period produced its alterations by subsidence to the south and east, which admitted the sea. The sum total of this was a complete alteration of climate. Sub-tropical conditions prevailed. The hills of the south-west were probably mountain masses, the sources of streams and rivers which flowed eastward and southward through jungle swamps to empty themselves into the Jurassic ocean.

A renewal of the subsidence inaugurated the Cretaceous period. The sea encroached as far as the present Teign valley, and again our peninsula formed part of the eastern shore of a continent—a shore characterised by rias and washed by the sea, in which the chalk formation was gradually accumulating.

Once more conditions reversed—the sea receded and the Jurassic peneplain arose, mantled with Cretaceous deposits. It is to this emergence that the initiation of our present scenery must be ascribed. In the West, where deposition had been least, the rivers tended to return to their old valleys, and although an enormous period of time has elapsed, the old Cretaceous plateau, now greatly dissected, is still very evident, stretching as it does from the Haldons to the Blackdowns. The chalk has since been removed from a large area by solution, but the evidences of its previous existence in the flints and casts of echinoderms found on the Haldons and elsewhere are abundant. Many of the roads (with their flint dressing) in the neighbourhood of Haldon remind one forcibly of those of the Chalk downs. Curiously, few traces of a Chalk flora remain.

From this time onward the geological action has been simply concerned with the re-arrangement of the accumulated sediments, and little structural change has occurred. A noteworthy feature is an early formation of this Tertiary time, namely, the Bovey lignites, laid down in lakes formed as a result of either (1) local differences in the rate of elevation of the land, or (2) synclinal flexures of post-Eocene date. The Tertiary geology of the peninsula has not yet been completely interpreted. Much information regarding the curious plateaus that occur at various levels, notably at 430, 800, and 1,000 feet respectively, may be obtained from the Geological Survey memoirs. Their discussion demands a minute treatment that is not permitted by space. Further, they are best studied in the field.

The Glacial period affected the area indirectly by the severe climate it induced, and the seasonal thaws engendered rushing torrents that deposited the buff coloured gravels that cap the cliffs of the region. Following the Ice age came the elevation evidenced by the raised beaches that occur around the coasts, when the rejuvenated rivers cut out the deep and narrow valleys and the European animals crossed the resulting channel bridge, to be isolated by a land subsidence which manifests itself in the submerged forests and rias, and which, judging from the rate of coastal erosion, must still be proceeding.

THE INFLUENCE OF THE GEOLOGY.

From the scenic aspect one fact is outstanding—the structure has profoundly influenced the relief and consequently the suitability for habitation. The upland areas are coincident with the granite outcrops ; the alternating steep hills and deep narrow valleys occur wherever Devonian rocks reach the surface; the carboniferous formations have produced bare and rugged heights, while the appearance of Permian and younger deposits is indicated by the low undulating plains of the Exeter district.

Equally important is the control exerted upon the soil. The elevated tor-crowned heights of Bodmin and Dartmoor give a thin peaty sand and barren soil, the valleys in such areas being filled with a moist clay very suited to corn crops if well drained and supplied with lime. The lesser granite heights weather to a fertile loam rich in potash. The Devonian weathers down to a dark red stony loam well suited to root crops. Grasslands on this formation are exceedingly rich, but deteriorate after a few years and need to be rested. In the South Hams, where much calcareous clay occurs, e.g., from Plymouth to Torquay, very productive light loams result, while the Devonian soil of Cornwall is particularly suited to early potatoes. The Carboniferous shales and grits, which form an elevated plateau across North and Mid-Devon and North-east Cornwall, break down into poor buff-coloured clay soils unsuited to pasture or crops. The eastward extension is approximately delimited by the Exe, where the shales are overlain by the New Red sands and marls, which floor the valley from the Haldons to the Budleigh Pebble bed escarpments, and comprise some of the richest pasture land in the kingdom, breaking up to a rich loam with a clay subsoil, well drained and highly suited to hardy cereals, root crops, and garden produce. Beyond the heath, like pebble bed escarpment, are the heights of thin Greensand soil giving good pasture, the intervening valleys of red marl being very fertile and productive.

The nature of much of the rock of the peninsula has resulted in a plentiful supply of streams, which have been of great assistance to local industries, such as tin-streaming and the woollen industry, in the past, and, more recently, the production of china-clay. It is important to note the possibility of utilising this water energy.

The effect of the geology upon the drainage system is unique. To understand it fully, it is necessary to realise that the scenery now existing is a reduced, slightly altered copy of that of Permian time. Then, and during subsequent periods, the Tamar and the Cornish rivers probably fed some larger rivers flowing eastward in the Hercynian valleys. This was also the condition persisting during Eocene time, when a secondary radial distribution from Dartmoor was initiated. Apparently the streams of North, Central, and South-east Devon combined to form several tributaries of a river flowing eastward. The largest of these tributaries flowed through the Burlescombe Gap. During Miocene time the Alpine upheaval imparted a southward and westward tilt to the peninsula. The net result was the present system of drainage, the eastward flowing streams adapting themselves to conform to the altered slope. The resulting dry valley at Burlescombe is now the main means of entry to the South-west, and is followed by the G.W.R., the G.W. canal, and the main road.

The impetus given to the streams which flowed south enabled them to erode the heads of their valleys, and ultimately to capture the head waters of many of the main east-flowing rivers. Especially was this so in Devon, where, as Jukes Browne has shown, the present estuary of the Teign was initiated by the Lemmon, of which that portion of the Teign, now known as the Lower Teign, was a tributary. The Upper Teign, leaving Dartmoor as a consequent stream, probably originally flowed eastward in the neighbourhood of Exeter. The southerly tilt of the country enabled the Lower Teign to capture the head waters of the Upper Teign, so producing the present river. Examination of maps and of the district will disclose many similar examples of river piracy.

Consideration of the industries emphasises the influence of geological structure upon the region. By far the greatest effect is that produced by the igneous intrusions which, despite their great age, have not reached that state of denudation arrived at by the Scottish Highlands for example, where the mineral-bearing thickness of rock has been removed. The failure of the ice-cap to reach the area probably partially accounts for this. A few miles advance to the south would have resulted in the removal of the rotten granite, and the consequent destruction of the china clay. The consequences cannot be entered into at length here, but the Potteries would certainly have been gravely affected. The tin and copper production also would have been vitally affected, and as a result the history of the tin plate industry might have been vitally altered. Equally interesting is the speculation as to what would have been the history of the region had it lain nearer the coast line during the Carboniferous era, productive coal measures replacing the culm, a local supply of tin and other minerals, clay and wool, all the natural factors necessary for the growth of a vast industrial area. This geological accident has resulted in producing an area mainly agricultural, and is a striking example of the decay of a region well furnished with supplies of raw material through lack of a source of energy. The mineral wealth of the granite areas is great and varied—tin, copper, silver, lead, manganese, tungsten, arsenic—all are present even now in quantity, and await only improved methods of recovery. Recently a specimen of iron ore, and containing a high percentage of metal, was submitted for determination to University College, Exeter, by a local farmer, the deposit from which it was removed covering a large area. Little mineral wealth is found in other formations which are mainly of agricultural importance.

Some mention of the climatic characteristics is necessary before interpretating their influence.

CLIMATE.

Two factors combine to produce remarkable local variations in the climate of the peninsula.

(a) The rapid alternation of hill and valley.

(b) The varying direction of the slope.

Broadly there are three distinct zones.

A. The Coastal—most equable, highest mean annual temperature and least daily range.

B. The Transitional—greatest daily range.

C. The Upland—lowest mean annual temperature and greatest rainfall.

A.	50.7 F.	35.6 ins.	10.9 F.	1680 hours
B.	49.6 F.	42.8 ins.	14.7 F.	1580 hours
C.	48.6 F.	57.9 ins.	12.5 F.	1480 hours

Generally speaking, the rainfall and percentage humidity increase with altitude and decrease eastward, the sunshine increasing eastward. Devon has approximately an average of 185 wet days per annum, Cornwall 195. The daily range in temperature also increases from west to east. In many districts the daily range is less than that of the Madeira Isles. The fact that easterly winds striking the region have passed over a relatively warm mass of water is one reason for the generally high winter temperature.

Combining the soil characteristics, relief, and climatic factors, it is possible to divide the area into eight distinct regions, which for convenience are tabulated as follows :—

Region.	Geological Formation.	Mean Annual Temperature	Mean Daily Range	Mean Annual Rainfall.	Remarks.	Physiological Effect.
North-West Cornish Coast.	Ordovician Devonian.	51·5°F	8·7°F	33·9ins.	Equable. Quick Drying. Dune type of coast. Bare heights and heavily wooded valleys.	Bracing
South-West Cornish Coast.	Granite Ordovician Devonian.	50·2°F	8·6°F	41·7ins.	Sub-tropical vegetation. Aloes palms, &c. Flourish. Quick drying with much sunshine.	Relaxing
Central Cornish Ridge.	Granite.	50°F	12°F	49·1ins.	Bare and wind swept (witness the stone hedges) Unsuited to cultivation and habitation.	Bracing
South Devon and South-East Cornwall.	Devonian.	51·5°F	11·1°F	35·6ins.	St. Germans to the Teign valley. Equable. Extremely fertile and well-wooded valleys.	Relaxing Generally
Dartmoor.	Granite.	46°F	12·7°F	84·4ins.	Extreme. Careful planting of SYCAMORES should produce a great alteration and increase the value of the area. High humidity and very subject to fogs.	Bracing
North and Mid-Devon plateau.	Carboniferous.	44·1°F	12·3°F	42ins.	Bleak and Windy with a damp slow-drying soil. Unproductive and poor pasture land leading to a scanty population gathered in exposed villages.	Bracing
Exmoor.	Devonian.	50·9°F coast	8·4° F coast	52·9ins.	Climate varies with exposure i.e. northern, ridge and southern areas differ considerably. Deep wooded valleys giving good grazing regions.	Varies with Slope and Altitude
South-East Devon.	Secondary Strata.	50·3° F	11° F	30·5ins.	In the Dartmoor rain shadow-hence a high percentage of sunshine. Extremely productive especially in broad well timbered valleys.	Relaxing

Natural Productions and Mineral Wealth.

These are directly dependent upon the climate and soil, but the history of production of the component counties of the peninsula differs. The south-eastern region has always been an agricultural centre, but West Devon was the site of the commencement of the tin industry, which gradually migrated westward, until during mediæval time it centred in East Cornwall. During these middle ages Devon became the producing ground for Cornwall, at this time almost exclusively a mining region. With the decay of mining, the population turned to agriculture, with the result that the percentage population now engaged in agriculture in Cornwall (10.5) exceeds that in Devon (8.5). These percentages are gradually decreasing, owig to the movement of rural labour to the towns. Despite the difficulty of labour, production has been largely increased during recent years, though it must be admitted that the necessity for special effort during the latter half of the war period greatly accounts for the increase, since much new land was broken up for the first time, in the effort to increase production.

Wheat does well on the southern slopes, where the percentage humidity is relatively low, but oats is the cereal that is most suited to the soil and climate. Speaking broadly, the soils of the peninsula lack available phosphate and potash. Further, many areas are deficient in calcareous matter, a fact which prohibits the continued use of acid manures. Judging from results, the best results are obtained by fertilizing with superphosphates and potash in the form of sulphate, or with basic slag, kainit and nitrates. Root crops—turnips, swedes, and mangolds—do very well, while the potato-growing industry is rapidly becoming a serious rival to that of Jersey in the London markets. Peculiar to Cornwall is horticulture—the growing of narcissi and wallflowers having spread from the Scillies to the western end of the mainland. The cultivation of fruit, with the accompanying cider manufacture, is an industry particularly favoured by the New Red Sandstones and marls. Nursery garden produce, chiefly broccoli, on a large scale is characteristic of all the lowland areas, attaining its acme in the fruit regions. Arising directly from the need of carriage for the vegetable produce is the " punnet," or chip basket, manufacture found in those districts. Generally speaking, a wide range of crops occurs as a result of the variety of soils. Cattle raising is extensive, and it appears probable that the Devon type is the direct descendant of the original animal of early British times. Only on the water-logged culm, where foot-rot is caused by the damp soil, does the industry fail to reach large proportions. Here its place is taken by pony breeding, an occupation that extends from the Mid-Devon plateau to Exmoor. Despite the spurt in cereal growing, occasioned by the war necessities, dairy farming is gradually on the increase, at the expense of crop cultivation. The following figures, relating to agriculture and stock-raising, will enable various deductions regarding the area to be made. Since the Board of Agriculture do not publish district returns, their method has been followed in the tables.

	verage Acreage—1909-1913.		Average Yield per acre—1904-1913.	
Crop.	Devon.	Cornwall.	Devon.	Cornwall,
Wheat ...	45,794	17,664	27.3 bush.	29.53 bush.
Oats ...	122,693	68,525	37.69 bush.	39.07 bush.
Barley ...	45,794	31,945	31.06 bush.	32.3 bush.
Potatoes	10,981	4,752	5.5 tons.	6.23 tons.
Turnips and Swedes	47,373	13,958	12.69 tons.	14.81 tons.
Mangolds	34,364	11,600	21.08 tons.	23.81 tons.
Grass ...	697,219	259,337	24.62 cwts.	27.67 cwts.
Clover, etc.	185,228	183,559	25.62 cwts.	30.17 cwts.
Total area	1,666,797 acres	866,320 acres.		

	Average number of Stock Devon	Cornwall	Average per 1000 acres Devon	Cornwall
Horses	59,248	35,468	36	41
Cattle	302,693	221,537	181	255
Sheep	879,687	391 804	526	452

Agriculture predominates in the eastern half of the peninsula, but west of Dartmoor mining has, until recently, held its own. Again the importance to the area of its geological structure is apparent, for it is in the igneous outcrops that the important metalliferous deposits occur. The mineral-bearing lodes run generally in an E. and W. direction, with occasional cross-courses, and traverse the metamorphic aureole that surrounds the granite, tin being found in the granite. The fractures which accompanied the earth movement of Post-Carboniferous time served as channels for the escape of metalliferous vapours and solutions, resulting through a process of "magmatic segregation" during consolidation of the molten masses, whose intrusion coincided with the folding. J. H. Collins deals exhaustively with the mineral wealth of the area in his "Observations on the West of England Mining Region," and has mapped over thirty centres, the majority being found west of Tavistock. The writer has reason to believe, from personal examination of many of these, that the present depression need not continue. The decrease in demand for tin and copper since the Armistice, with the consequent fall in price, has reacted upon the production of these, the most important of the minerals of the south-west, for, owing to the depth at which they are found, a high market price is necessary to enable the mining companies to compete with producing areas where the ores are more easily accessible and labour cheaper. The decline in production during the past fifty years is pronounced, as the following statistics indicate :—

	Years	Average annual production of ore
Tin.	1873-1892	14,273 tons.
	1893-1912	8,138 ,,
	1910-1914	6,815 ,,
	1919	5,156 ,,
Copper.	1851	over 13,000 ,,
	1888	8,638 ,,
	1910-1914	686 ,,
	1919	159 ,,

The causes of the decline are by no means due to exterior economic factors. It has been pointed out by witnesses before the Government Committee on "Non-Ferrous Mining" that a subsidy accompanied by concessions in railway rates would do much towards counteracting these. On the other hand, radical internal reorganisation is required to make mining in the region a paying proposition. From 50 to 75 per cent. of the metallic tin is recoverable from the ore, with improved methods of treatment. Undoubted fresh sources of supply can be expected and realised, if local landlords can be induced to grant prospecting rights to bona fide investigators, who have thoroughly acquainted themselves with the varied mineralogical features peculiar to the different mining areas. Other than tin and copper, the only minerals that will repay working to any extent are arsenic, wolfram, and iron, the ore of the latter exceeding in percentage yield of the metal that of Durham.

Apart from the rock contents, the rocks themselves are of great value to the region. Kaolinisation of the granite mass has taken place in each outcrop, but to the greatest extent in the east. By this type of pneumatolytic action, the felspar of the rock is broken down, and, where the change is complete, china clay results ; where an intermediate stage only has been reached, the product is china stone. Together with another change, known as "greisening," kaolinisation results in the setting free of quantities of mica, a by-product of the china clay industry. In 1816 the output of china clay was 1,775 tons. By 1895 it had reached 286,000 tons, and a steady increase in production enabled the 800,000 ton mark to be touched in 1914. A sharp decline occurred during the war years, but a rapid return to pre-war prosperity is now evident, the output having increased from 400,000 tons in 1918 to over 600,000 tons last year. In addition, over 60,000 tons of china stone are raised yearly. Various important aspects of this industry are considered later. Of lesser importance is the "potters' clay," characteristic of the sedimentary formations, notably at Bovey and near Barnstaple.

Even when unaltered the formations are frequently of importance. About half a million tons of igneous rock alone leave the region annually. As might be expected from the preponderance of their occurrence in the west, it is from areas centred upon Bodmin and Penryn that the largest amounts proceed. The limestone quarries of South Devon and North Tawton are just as important from the point of view of the amount taken out annually. Cornwall is practically destitute of limestone, as might be anticipated from its geological structure, but has its slate quarries of the Delabole and Camelford area. Other rock and mineral products of lesser importance are barytes, sandstone, flints, umber and ochre, all being found east of the Tamar, the output of each being indicated below :—

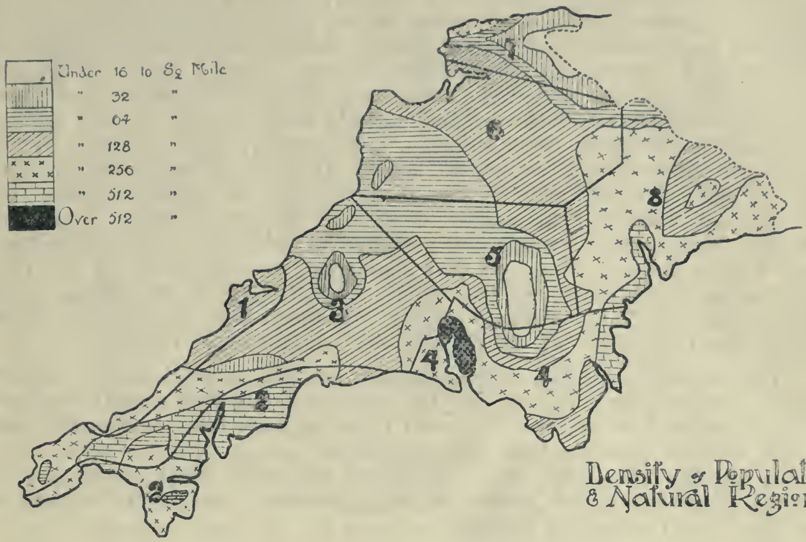
Average yearly production in tons. 1910-1914.

Material.	Devon.	Cornwall.
Limestone	479,527	—
Igneous Rocks ...	219,930	312,503
Barytes	2,439	—
Slate	5,090	18,700
Sandstone	60,279	6,614
Mica	10,178	16,607
Potters' Clay ...	81,489	—
Flint	20,232	725

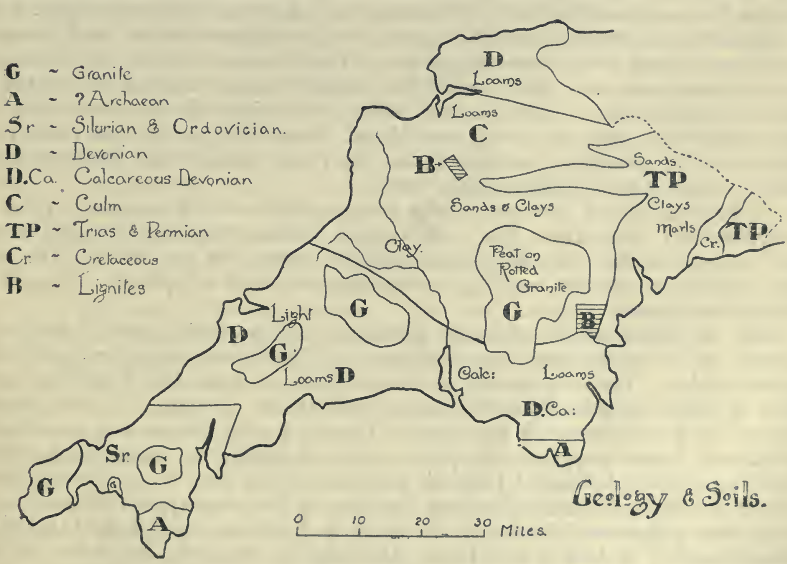
No survey of the natural sources of wealth, however brief, would be complete without some mention of the fisheries. Off the northern coasts, herrings are obtained, but they are not found south of the latitude of Padstow, which is apparently the most southerly point reached by this cold-water fish. Off the southern shores, spring mackerel and pilchards are the chief catch. Padstow appears to be the northern limit of the warm water loving pilchards. The latter appear usually in July, moving eastward along the north and south coasts, from Mount's Bay, the point for which it apparently makes during its journey from the winter quarters, south-west of the Scillies. Very rarely do pilchards occur east of Padstow or Start Point. For the mackerel and pilchard fisheries the centres are St. Ives and Newlyn, the first being caught by the old method using a seine. This is the method in common use by the herring fishers of the north coast, but trawling is resorted to by those engaged in the following of white fish, Plymouth and Brixham being their bases. The cultivation of oysters is a growing industry in the neighbourhood of the Fal.

THE HUMAN ELEMENT.

The study of human antiquity in the south-west is a matter of long vistas, for the recent discoveries of rude quartz implements (Clement Reid, Q.J.G.S., 1904), and the investigations of Kent's Cavern (Pengelly), favou the probability of human habitation of the south-west since the early palæolithic time. The palæolithic is sharply separated from the neolithic



Density of Population & Natural Regions.



Geology & Soils.

locally, and the picture of neolithic time here is still very inadequate. Towards the end of the neolithic period the area was introduced to the megalithic civilization, since when its connection with Brittany has been an outstanding fact. The Beaker-peoples who spread at the same time to Britain, across the North Sea, did not touch the south-west, though they obviously advanced up Southampton Water to the Salisbury Downs. Devon and Cornwall are very rich in megaliths, especially the extreme west of the latter, and there can be little doubt that these monuments have some relation to early mining by prospectors from the Meditteranean. In pottery, from the dawn of the metal age onwards, the south-west seems often related rather to Brittany than to the " Downs " country and thus, far back in prehistoric time, we note the beginning of that marked distinction between " Downs " country and the " South-west " which has persisted to this day. The Glastonbury Lake Village Reports bring out that distinction very markedly for the Iron Age, during which, however, the culture characteristic of the English plain affected some parts of Cornwall evidently in touch with the coasting trade that carried the designs of the famed Celtic ornaments to Ireland.

The correlation of hut circles, earthworks, and so on, is risky work at present, and one can only note that the earthworks are now usually assigned to the latter part of the Iron Age, and those on headlands are possibly connected with the coasting trade just mentioned. As in West Wales, traces of the Romans are scarce here, but during and after their occupation of Britain, Brythonic speech spread to the south-west, and from Cornwall in the fifth century across to Brittany.

Of the traces of the peoples of antiquity in the present day population, it is difficult as yet to say but little. Around Dartmoor and other moors survivors of ancient long-headed types, with slender build and dark colouring, are abundant, and are identified in local legend with the ancient Ivernian. They doubtless include amongst themselves representatives of most of the Stone Age peoples of Britain. The terminal peninsula of Cornwall, the projection of South Devon, and other parts, have a proportion of dark, broad-headed men, identified on many points of the European coasts as survivors of the prospectors who spread from the Mediterranean looking for metal in the early Bronze Age. The sunken valleys with their fine harbours have a good number of tall, fair men, possibly of Norse origin, but the county is notable for its wealth in old types, and to try to identify the Brythons and others seems an almost impossible task.

A hopeful line of research is the geographical one of mapping types of place names. The rivers Tavy, Taw, and Tamar probably have the same root—Tay—and that root is present in river names far and wide. The distribution of such names would give valuable evidence of spreads of civilization in the far past.

The Brythons were not finally subdued until the early part of the tenth century, up to which time the kingdom of Dumnonia struggled valiantly against odds. There is reason to believe that at times the Brythons were aided in their resistance by the Danes, but to no purpose. The Saxon colonisation never extended west of the Tamar, but in Devon was practically complete. If one may judge by place-names, it was by no means of a gentle character. Several decided lines of places showing the Saxon termination " stock " (stow or stoke) exist, and the lines of invasion appear to have been through the gaps now followed by the G.W.R. (Culmstock) and the L.S.W.R. (Chardstock). A line drawn from Michaelstow through Davidstow to the Tamar marks the westward limit of the incursions. East of this line the lands of the Brythons were confiscated and distributed among their Saxon conquerors, who re-named the places, so producing the strong Saxon element visible in Devon place-names to-day, e.g., bury, ham, worthy, etc. That they did not succeed in eliminating the influence of their predecessors is also evidenced by the survival of Celtic names, e.g., dun, dour, pen, etc.

The succeeding conquest, that of the Normans, was much more complete if considered merely as a subjugation. Similar treatment to that accorded the Brythons by the Saxons was meted out to the latter by their Norman conquerors, with this difference—they were permitted to retain their lands under a feudal tenure. Therefore, relics of Norman influence in the peninsula are few ; occasional place-names, however (e.g., Berry, Pomeroy), testify to the settlement of Norman lords in the vicinity. . Two events of peculiar significance occurred during Norman time—the opening up of the tin mines and the disafforestation of the whole of the east, excepting Dartmoor and Exmoor. The huge earth hedges of Devon prove the efforts of early farmers to prevent the depredations of big game, prior to the relaxation of the forest laws.

Caused to a large extent by the Saxon and Norman oppression, emigrations of numbers of the Celtic peoples to Brittany were frequent. The peaceful intercourse between the allied peoples was thus further encouraged. In the reign of Henry VIII. one-sixth of the taxable population was of Breton origin, and even to-day Breton surnames and place-names are found in the county. So close was the connection that the old Cornish dialect was more akin to the Breton than to Welsh.

From the Norman period onwards the history of the region is largely social and industrial, becoming more and more a part of the country as a whole. During the era of wooden ships of small size, the seaports of the west, especially Topsham and Bideford, reached the acme of their greatness ; the presence of timber, the numerous rivers penetrating far inland, the adventurous habits of the people due in a great measure to their peninsular position, and the location with reference to other great powers, accounting for the activity that reached its height in Elizabethan time. The increasing size of ships rendered impossible the maintenance of this maritime pre-eminence, although the more favoured rivers, aided by their position relative to the New World, retained their importance as packet stations and ports of call. For nearly two hundred years Falmouth was the base of the packet service, and although the cessation of sailings in 1850 dealt the town a severe blow, local enterprise is doing a great deal to restore its importance as a port of call for orders and repairs. Plymouth has succeeded in retaining and increasing its importance, largely as a result of the establishment there of naval dockyards, but, as commercial centres, the factor of remoteness is an effective barrier to greatness with all seaports of the peninsula.

Apart from the maritime factor, the chief controls of the development of South Western England are epitomised in the old Cornish toast, " Fish, Copper, and Tin." Other influences have in turn made themselves felt, but not to the same extent as these. The tin industry commenced with the working of detrital deposits, resulting from the degradation of lodes by atmospheric agencies ; the " stream tinning " gave way in time to mining operations conducted on a large scale. Various factors contributed to increase the demand for the mineral during the period of prosperity, notably the invention of cannon, the pewter industry, the introduction of tin plate, the development of printing types, and, later, the extensive use of anti-friction alloys. The introduction of Stannary Courts—the tinners' parliaments—doubtless contributed towards producing the independence of mental attitude, manifest to a degree to-day. Further, the rights obtained by miners to prospect over any agricultural land in mediæval time resulted in a disregard, often a contempt, for farming, that still exists among the people of Cornwall. The future history of Cornwall depends, in a great degree, upon the action that is taken to repair the state of decay into which the tin industry has fallen.

Owing to the need for powerful drainage machinery, the rise in copper mining was coincident with the rise of the steam engine.

The decay of mining has not been without its effect upon the population. Numbers of miners, possessing the hereditary skill born of close association with minerals, have migrated to North America and South Africa. Such migrations still take place, largely from Cornwall, but contrary to the usual nature of things, these emigrants return when a competence has been secured. Such travels serve to counteract the narrow outlook bred by their surroundings. Other miners have turned their efforts to agriculture, fishing, or in late years, to the quarrying of china clay, of which the south-west may fairly claim to be the world's centre of production, the most important district being that of Hensbarrow. To this has been attracted part of the population of the Camborne and Redruth areas, a movement that will continue with the growth of the industry, which is particularly sensitive to fluctuations in the pottery and paper-making manufactures, for these trades absorb 95 per cent. of the output, half of which goes to the U.S.A.

The increasing demand for clay by chemical manufacturers foreshadows expansion in the clay districts, with the corresponding growth of the ports from Plymouth to Fowey engaged in handling the product. Four factors that will better the trade are:—better pumps, more careful grading, improved transport, and more economical drying.

The needs of mining in the past, together with the quarrying activities stimulated by the demand for docks, led to the establishment of small iron foundries, and factories for manufacturing blasting explosives at Hayle and Perranporth. These, too, have decayed markedly since the more accessible Scandinavian granite has reached the market, and the Perranporth factory now makes artificial manures.

The physical relief is largely reflected in the distribution of population. The igneous masses, the wind-swept Cornish ridge, and the cold, damp clays of the Culm plateau, are thinly peopled, except where a fertile valley renders cultivation possible. Districts offering greater promise are populated evenly around a market centre. The reaction between rural districts and towns is marked, the latter expanding at the expense of the former, but increased town ratings and improved communications are tending to restore the numerical balance.

The South-west is a perfect example of a region blessed with natural wealth, but lacking a source of power. In addition to the examples quoted, the story of the woollen industry is a variation of the same theme of rise followed by decay. It has been ably treated in a former article (Geographical Teacher Reprints, No. 10). By the valleyward movement of peoples it produced, by the place-names, e.g., Stoke Fleming, by such surnames as Webber and Tucker, and by the small survival at Buckfastleigh, its one-time importance is recalled. Similar is the story of agriculture—arable land, especially that devoted to wheat, is gradually being replaced by pasture, to which the climatic conditions are more favourable. Only slight fluctuations are apparent in the number of head of cattle, but sheep have decreased rapidly with falling prices. The differing sets of conditions produced by the varying types of soil and climate are worth investigation by local workers.

To those resident in the region the present tendencies are of vital importance. Since 1801 Devon has doubled its population; that of Cornwall increased rapidly with the increase of mining, prosperity reached a high water mark in 1861, from then until 1901 it showed a decline. The development of clay mining, and the improved communications, bringing streams of visitors, stayed the decrease and restored the balance. The thickest centres of population in Cornwall are still the mining districts, but in Devon the distribution is much more even. The fishing centres have improved as a consequence of the introduction of motor boats, State assistance, and the spirit of co-operation, and promise to regain their ertswhile importance and to retain their populations. Census results show a decidedly low rate of immigration, the percentage of native born being 83 in Cornwall and 75 in Devon. This doubtless explains the increasing "clannishness" as one journeys westward. This does not imply a condition of stagnation, but rather a self-centred outlook, born of isolation both local and regional, an isolation that is more apparent in the west. Thanks, however, to the variety of intercourse with active areas, induced by the peninsular position and the nature of past industries, the region is progressive. One scheme of outstanding importance is at present under consideration—the utilisation of the Bovey lignite beds. Estimated to contain more than 850 million tons of lignite, these beds are a potential source of power. There are indications that the difficulties of distilling the lignite are being overcome. If this is done, commercial oils will result, and it is estimated that several millions of cubic feet of gas will be displaced from the lignite yearly. The proposal to use this for the generation of electricity may result in vast changes in the Newton Abbot area. It is too early to speculate, but the possibilities are readily apparent. The latent energy of the streams of the area must not be neglected. Of an available horse-power amounting to nearly two thousand in the Exe, only one hundred and fifty is used. The region cannot be revolutionized, but the present distribution of population and occupations may be affected considerably. If one may consider that a demand for the satisfaction of the mental and moral needs of existence is a criterion of virile development, then the desire of the South-west for an institution to supply the highest forms of education—the University—is concrete evidence of progress. The stimulation resulting from the attainment of this ambition will react upon the whole region.

Space forbids a discussion of the respective merits of the two great nodes, Exeter, the ecclesiastical and administrative capital, and Plymouth, the commercial centre, each the product of its location, but developed along different lines.

For the same reason, it is impossible to analyse past census returns, a valuable procedure in view of the approaching enumeration, since such analyses materially assist the interpretation of the present trend.

There are many problems, and few investigators where numbers are needed. To any who purpose research in the area, the writer will be glad to give any information at his disposal.

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Bradford. 64 pp. Publ. by the Anglo-South American Bank. 1921.

A finely illustrated account of the rise of Bradford, published by the bank which has been brought there by the wool and alpaca trades. There are very telling maps of Bradford in 1800 and 1920, about thirty large photos of old prints and modern buildings, an account of the origins of Bradford, and a quantity of valuable statistics of trade. The book provides a dignified record of many features of Bradford that are disappearing or have already gone, and will be found to be of great value and interest to teachers both in Bradford and out of it. We commend it to our readers and thank the Bank for its remarkable enterprise.

Imperial Institute Series—Coal. 166 pp. Numerous sketch maps. 6s. John Murray. 1920.

With this book the Mineral Resources Committee continues its useful work, surveying in this case the coal resources of all the regions owning allegiance to the King. There is a short historical introduction, and the book ends with a useful bibliography. Analyses of the coal are given in many cases, as well as estimates of the reserve coal still available. A classification of coal with definitions is a useful feature, as is a table of the world's reserves, bringing out the immense importance of anthracite coal reserves in China, one of the outstanding facts of the economic future, especially if, as seems possible, the Chinese contrive to guard their treasure against "The White Peril." The immense reserves of bituminous coals and lignites, etc., in U.S.A. and Canada is another feature. The world's consumption of coal in 1913 seems to have been nearly 1,300 million metric tons, and the total reserves of all grades, including much that is merely probable, are somewhat more than 5,000 times that amount.

Turanians and Pan-Turanianism (I.D. 1199, 256 pages and large map, 7s. 6d.) is a volume of a character different from that of all others reviewed. After an introduction on the term Turanian and its meaning, it proceeds to survey these peoples socially and historically under many sub-divisions of the five great groups selected—Finno Ugrians, Samoyedes, Tungus, Mongols, and Turks. This is a more complex grouping than that suggested by Miss Czapliczka into Tungus and Turks. Turanian is used in this book to cover those who speak languages claimed to be more or less akin and distinct from Argan, Semitic, or Chinese languages; they are claimed to have some common physical characteristics, they are or have once been nomads, and their religion is either Shamanism or is said to have grown from Shamanism. There is no book comparable with this one for purposes of quick reference, and this feature is not a little helped by the excellent index.

The Arts and Crafts of Polynesia and Maoriland.

THE islands scattered throughout the Pacific Ocean and known collectively as Polynesia, lie between the eastern shores of Asia and the western shores of America. They are inhabited by races which may be roughly divided into two classes: the Negrito-Polynesians, dark coloured, highly-excitable people, differing certainly in their prominent characteristics, of which the Fijians and Solomon Islanders may be taken as examples; and the Malayo-Polynesians, lighter coloured races, intelligent, and good tempered, more tractable people, which include the Hawaiians, Tongans, Samoans, and our good friends the Maoris.

It has been said that the Maoris have some Mongol affinities; that occasionally the characteristic Mongolian eye may be found among them; that is, the eye set obliquely with a fold in the inner corner of the eyelid, so common among the Chinese and the Japanese. This may be so; but I have never seen a case myself, and it has not been for the want of looking. I have had an opportunity in New Zealand of inspecting a collection of portraits of the old Maori chiefs, and certainly there was no case of Mongolian eye among them. But Mongolian or no Mongolian, they are the most gallant and intellectual of the Polynesian races.

Australia is not properly included in Polynesia, but as I shall refer to the few arts and crafts practised by the Black Fellows, I may mention that they are the most degraded and undeveloped people in the world; they seem to be a race apart; they have no apparent ethnic affinity with any other race, a fact upon which other races may fairly congratulate themselves.

Before coming to specific instances, it may be as well to make a rapid survey of the culture of the Polynesians in general. Long before the Europeans had come in contact with them, they had reached a high degree of what may be called civilization. It is true they were still in the Stone Age, but so efficient were their tools and so skilful were they in using them, that they were then able to execute work which they have not improved and never equalled since they have had the use of more modern appliances. No nation exists to-day unacquainted with the use of fire, but there are many methods of obtaining it; all—that is among primitive people—based upon the generation of heat by friction. The Australian uses a whirling stick which is rubbed between the hands, but this is a slow and laborious undertaking and requires the work of two men, who relieve each other in turns, and even then it is a considerable time before a flame can be obtained. The Polynesian rubs a pointed stick of hard wood against a very dry board of softer wood; in time a little hollow is produced, which is filled with dust; this dust in time becomes sufficiently heated to be blown into a flame with the breath.

The Polynesians always cooked their food, the cooking being done in earth ovens, which are simply holes dug in the ground. Hot stones were placed at the bottom and covered with leaves; on these the food was placed and more leaves added; the whole was then covered with earth, and so left till the cooking was done. I have it from an Australian friend who lived among the Maoris, adopting their customs and their language, that no French chef could produce more delicious dishes than those cooked in this apparently primitive fashion.

For artificial light the Fijians used oil lamps. The oil container was half a coker nut shell; the fuel was coker nut oil, and the wick was the fibre of the same plant. Indeed to the Polynesian the coker nut palm stands in pretty much the same relation as the seal does to the Eskimo; it supplies him with food, clothing, fuel, and material to build his houses. The candle nut—the ku-kui—is used throughout the islands. These nuts are about as big as walnuts ; they are slightly roasted and strung together on a rush or some fibre, and they make admirable candles for every possible purpose except that of emitting light.

The dwellings of the Polynesians, apart from the Maoris are pretty much all of the same type ; the uprights are of bamboo or palm stems, and the roofs are thatched with grass or leaves ; sometimes the sides are left open, as in Samoa, filled in with grass as in Fiji, or with woven mats as in Samoa. Furniture gave very little trouble to the Islander ; a few cooking utensils and a plentiful supply of mats satisfied his wants. There was little need of clothing in such a climate as prevails in Polynesia, but the natives never went absolutely nude ; the sulu was and is universal, and in the old days was made from tapa cloth. Kilts of fibres and leaves were also used, and they form the garments of the dancing women to-day. Pottery where it was made was moulded by hand, either in baskets or by the coiling process as it is called, but it was not universal, and the main utensils were made of wood.

It has been said that the more a people love ornaments the less capable they are to produce drawings properly so called. Certainly no people love ornaments more than the Polynesians, and they are past masters of the art of appropriate ornament. Their motifs are mainly geometrical—if such a term can be applied to the products of a people who had no knowledge of geometry—or they were suggested bv the animal forms around them ; yet they are quite incapable of rendering anything like a natural representation of animal or human forms. They never produced anything but grotesques. Speaking broadly, primitive people always ornament construction and very rarely construct ornament ; their decoration is generally appropriate and does not interfere with the proper use of the article ornamented. I am afraid that this is not always the case among more advanced people. Their carvings were triumphs of patience and skill—and it must be remembered that they worked with stone tools—and they lavished an enormous amount of work on the decoration of their paddles, weapons, boats, and domestic utensils.

Their musical instruments were few and simple, usually the drum and the flute, the latter being made from bamboo or of the leg bone of some animal, and human thigh bones have been made to serve the same purpose, particularly among the Maoris. Some of the Islanders had a drum language, and could carry on a conversation with their friends at a distance by regulating the sounds of the instrument and the intervals between those sounds.

Their weapons were mainly clubs of wood or bone, and with the Maoris they were of greenstone ; they are of a multitude of patterns, and in most cases decorated with most delicate carving. Knives were made from bamboo, and formed most efficient cutting implements ; flints and sharpened shells served the same purpose. Throughout Polynesia whales' teeth were in great demand as ornaments ; they were strung together to form necklets, and the larger ones were ground down to serve as breastplates. Boars' teeth which were artificially curved did duty for earrings and neck ornaments. In Fiji a fine necklet of these teeth was a dangerous possession, and only remained with the owner so long as he was able to protect his treasure. Their domestic utensils were few and simple ; wooden dishes to contain their food and special bowls for kava were nearly all they had. Their staple dish—poi—was always eaten from a common receptacle, but the meat was served on separate leaves.

Coming now to specific instances, the first of the islands worthy of special mention is the Sandwich group, which comprises eight inhabited and four uninhabited islands. The largest is Hawaii, and like many of the Pacific Islands, it is the product of volcanic action. On it is the well-known volcano Kilauaa, sacred to the deity Pele, who was—in bygone days—propitiated by the sacrifice of human victims, maidens being thrown into the molten lava to become brides of the god. To the north of Hawaii is Molokai, the leper settlement, for so many years governed by the heroic Father Damien, whose good work is still continued by a few priests and a community of nuns. Still further north is one of the smallest but the most important of the islands, Oahu, which contains the capital, Honolulu.

The native Hawaiians are strong, muscular men, with a decided objection to overstrain those muscles. They have reddish brown skin and straight lank hair, which contrasts strongly with the stately mops of the Fijian. The Hawaiians have never been cannibals, a distinction very rare in Polynesia, and they have never disfigured themselves with tatooing ; for I am afraid that no matter how artistic the design, tatooing—at any rate to European eyes—must be regarded as a disfigurement.

They are a polite, light-hearted people, much given to singing and dancing, although the latter consists more in contortions of the body than in the movements of the feet. I have seen these Hawaiians perform what I suppose would be called a dance squatting on the ground. Although under their own kings, they attained a certain degree of stable government ; yet there were so many contending factions and so much corruption that ultimately they had the good sense to petition the United States Government to take over the administration of the islands, with the result that the condition of the natives is better and the prosperity of the islands greater than ever before. Their language is the most musical of the Polynesian tongues ; it has been called the Italian of the Pacific. There are only five consonants and five vowels, and there is an entire absence of guttural sounds.

The Hawaiians are as much at home in the water as on land, and surf-riding is a popular amusement. They swim some little distance out to sea on a board shaped something like a coffin lid. When they are beyond the surf, they mount the board, stand upright, and are carried to the shore on the incoming waves. That is to say, when they are not pitched overboard, which is often the case.

Hawaii is the most beautiful land I have ever seen. It is a land of sunshine, and there all nature seems arrayed in her brightest garb. The sea has an everchanging variety of the most gorgeous tints, more brilliant than in any other part of the world ; the flowers are of the most intense hues and of a size greater than those of less favoured climes ; the very fishes put on a livery of special magnificence in harmony with their surroundings. The native houses are probably the least attractive edifices of the Polynesians ; they are simply thatched huts, the sides being filled in with fibre or leaves, and they have none of the effectiveness of the stately grass houses of the Fijians nor the impressiveness of the domed houses of the Samoans.

There are some curious parallels between the work of the Polynesians and that of the more advanced European nations. As an instance, there is in the City of Honolulu a statue of King Kamehamaha I. When I first saw it, I. in my ignorance, imagined that the sculptor had represented a Polynesian chief in a classical helmet and a Roman toga. I found upon investigation that the old time Hawaiians made helmets of wicker work of exactly the same shape as the ancient Greek helm. These Hawaiian helmets were obviously useless as a protection ; they were simply used as an insignia of rank. What I imagined to be a Roman toga was the famous feather cloak. This feather cloak was probably the most notable example of such work in the world. It was the regal robe of the Hawaiian kings, and was only worn by them or by the more prominent chiefs. The feathers used were taken from the Oo bird ; it is a honey-sucker not much bigger than a sparrow, black or very dark green, with the exception of one or two golden feathers under each wing, and these alone were used in the fabrication of the mantle. The bird is extremely rare, and is only found in the mountainous districts of

Hawaii and Manui. It is trapped, the desired feathers are plucked, and the bird is liberated to grow a new crop. The feathers of another bird—also a honey-sucker—were also used ; this bird is known as the Mamo, but the feathers are red, and they are not held in the same estimation as the Oo product. The foundation of the mantle was a gauze-like fabric made from native hemp, and the feathers were attached one by one. So scarce were the birds, so great the difficulty of capturing them, and so prolonged the labour of making the garment, that a fine specimen took two or three generations to complete it, and when finished it looked like a sea of molten gold. As most Englishmen and Americans appraise pretty nearly everything in terms of dollars and cents, I may mention that the feather cloak of Kamehameha is valued at one million dollars—something over £200,000. Feathers were also used in the Kahilis—another Royal symbol. These were huge feather brushes, and they were made from the black plumage of the Oo in contrast to the yellow, which were exclusively reserved for the Royal mantles.

A characteristic product of Polynesia is tapa cloth. It is made from the bark of the paper mulberry ; this is stripped from the tree in pieces of about one inch wide ; these are scraped with a sharp shell, then soaked in water and beaten out with wooden mallets till the product is of the desired width. A strip originally an inch wide can be beaten out till it measures a foot, and it is then of gauze-like fineness. The strips are pasted together with a preparation of taro, and thus a cloth of any size can be made. If a thick texture is desired, several layers are pasted together.

The tapa is decorated in many ways ; it may be painted—and this is usually the case now—with simple geometric patterns, or it may be stencilled. The stencil plates were cut from dried banana leaves and the colour applied by dabbing it with a wad of fibre. The Polynesian has a primitive and yet a most effective way of printing the cloth ; fern fronds, leaves and flowers were dipped in colour and pressed on the surface of the cloth, and when this was carefully done the result was exceedingly artistic. Another mode—so far as I know—peculiar to Polynesia was also employed. The strands of bamboo were curved into various patterns and were attached to a board ; the tapa was placed over the raised mould, and the colour applied with a piece of the cloth. By this means they got a " repeat " pattern, and the result was decidedly effective. Unfortunately, the manufacture of tapa—of the better class—has fallen into disuse, and its place has been taken by the cheap and gaudy productions of Manchester.

The weapons, paddles, and domestic utensils of the Hawaiians are of the usual Polynesian type, and so far as my observations go, they are inferior in workmanship to those of the other islanders. Secret societies are common in Polynesia. The tenets are known only to the initiates. In their ceremonial dances they used many varieties of grotesque masks ; they were made of feathers, fibres, grasses, and they are made as terrifying as possible.

The Fijian group consists of about 150 islands, the principal being Viti Levu and Vanua Levu, of the former the capital being Suva. The Fijians are a race of artists' models, physically the most perfect men I have ever seen ; tall, stately, well-proportioned men, with highly developed muscles, and, it must be admitted, with a great antipathy to use those muscles in any kind of arduous work—not very marvellous when one considers that nature supplies practically the whole of their wants with a minimum of trouble in procuring them. Food may be had for the plucking and the fishing ; comfortable habitations may be erected in a rew days from the materials around them, and a couple of yards of tapa cloth or calico forms all the needed raiment.

Fifty years ago Fiji was the most notorious cannibal country in the world. In many parts where cannibalism prevailed there was a belief that the consumption of the flesh of a slain enemy would impart to the consumer the courage, the good qualities of the fallen foe ; but in Fiji, although this idea may have prevailed, yet there was a decided preference for " long pig " as an article of diet. To-day they are a mild-mannered exceedingly polite, if somewhat excitable, people, and it seems almost impossible to associate the present-day Fijian with their former revolting practices. In their days of cannibalism they had special ovens for cooking human food. The flesh was never touched with the hand ; they used peculiar spoons and forks, these latter being four-pronged. The Fijians have enormous mops of hair, stately and becoming, but like more advanced people, they try to improve on nature. They are not satisfied with the natural hue, and alter it by plastering their heads with a paste of coral limestone, which has the effect of bleaching the hair to a dirty red tint. They usually perform this operation on Saturdays, so that they may make an impressive appearance in church or chapel on Sunday ; for since they have become Christianised—a very thin veneer, I suspect—they are a much church-going people.

Like other islanders, they are mighty singers and dancers. Their singing can, I think, only be appreciated by a Fijian ; it is a long-drawn-out, low, whining, melancholy performance, decidedly unpleasant to the ears of a European. Their furious and apparently blood-thirsty war dances are characteristic ; the dancers work themselves into a frenzy and aim vicious blows at the heads of their fellow dancers, which, however, they are careful never to touch. They are famous trencher men, and consume an enormous amount of food. Their staple dish is the yam, which I have eaten once and trust to be preserved from ever eating again. I once attended the preparations for a Fijian feast, where fifty or sixty guests were expected. They had accumulated a stock of turtle,—I counted 28 of them—they had three pigs and a pile of yams six feet high ; so in view of the number of guests, it was evident that the catering was not on the present-day war scale.

There is one word always in the mouth of a Fijian—malua—presently—by-and-bye—particularly when he is wanted to do any work. It is very much like a word used by the Spaniards—although it has no philological connection—manana, manana—to-morrow, to-morrow ; for no properly constituted Fijian or Spaniard would do anything to-day which he could get someone else to do for him to-morrow.

The native drink of Polynesia is kava, ava among the Samoans and yanggona among the Fijins ; they are all the same thing. At the risk of falling very low in your estimation, I am afraid I shall have to admit that I have sampled most of the drinks in the countries in which I have been, but I have never had the courage to taste kava. This is due to a most unreasonable and absurd prejudice on my part against the mode of manufacture. Kava is the root of a pepper plant, which is ground in a mill, the mill being the teeth of the maidens of the tribes. When the milling process is complete, the product is mixed with water, and kava is the result. It is intoxicating so far as the drinker's legs are concerned, but does not affect his head ; continued use is said to induce paralysis. It is only fair to say that the Government has prohibited the manufacture of kava in this way, and the Samoan and Fijian girls may be seen pounding the root with stones when anyone happens to be looking. Special bowls are used to contain the kava, and in time they become coated with a beautiful green glaze, and fine specimens are highly prized.

The natives always wear, and have always worn, the sulu—a yard or two of tapa cloth wound round them. Even in the capital, Suva, the uniform of the native policemen consists of a thin tunic and a sulu with vandyked edges. Many of the higher class Fijians adopt European clothing so far as the upper part of their bodies is concerned, but the legs and feet are always left bare ; but so dignified are they that the result is by no means incongruous. Their grass houses are in many cases large buildings, and are most delightful residences for a tropical clime. The uprights are of palm stems, and the walls—if they can be so called—are often a foot thick, but the grass is so lightly packed that there is a current of air continually blowing through them, which makes the interior exceedingly cool. The floors are of coral limestone, which by being continually trodden on soon becomes a compact mass. They are beautifully clean, and the furniture consists of many mats, a few cooking utensils, and perhaps a wooden pillow. The mats are of almost incredible fineness ; they are used as beds, and it takes twenty or thirty of them to make a comfortable couch. The wooden pillows are much the same as those used in Japan ; the curve fits into the hollow of the neck, so that the stately mop is not disarranged during sleep.

Their weapons consist mainly of clubs. They are of many shapes, in fact any shape that will efficiently kill a man is pressed into service. There grows in Fiji a tree with a conical or tap root, with aerial roots just above the ground. When the tree is but a slender sapling, the stem is bent nearly down to the ground and pegged in that position ; it is then left to grow until it becomes sufficiently thick, and this takes some years. When of the proper size it is dug up, the tap root sharpened to a point, and the aerial roots reduced to a sort of encircling band each rootlet being also pointed. If the tap root should escape the head of an intended victim, he feels the prick of the aerial roots, and I should imagine that either was enough for all practical purposes. Most of their weapons have elaborate carving, nearly always of that sort known as chip carving, often of exquisite fineness, and when one considers that this carving was done with stone tools, one must admire the skill and patience of the old-time craftsman.

Palm leaves were woven into most exquisite fans, but the art has become practically extinct, and fine specimens are only to be seen in museums. The present-day productions are coarse and uninteresting, and are made mainly for sale to tourists. Baskets are made from fibres of various sorts and from palm leaves, and I have seen a Fijian take a broad palm leaf, split up the blade with a sharpened mussel shell, and weave it into a most artistic basket in almost less time than it takes to describe it. Tapa cloth is also made in Fiji—there called masi—in the same way as in the other Polynesian Islands, but the present-day make is much inferior in quality and ornamentation to that made in their unregenerate days.

So far as I know, the Fijians are the only Polynesians who made pottery of any merit. They were unacquainted with the potter's wheel, and their ware was moulded on a basket or made by the coiling process. It appears to have been baked in earth ovens, and they certainly succeeded in obtaining a soft greenish glaze. The Fijian substitute for bells is the native drum—the lali—which when struck emits a musical sound which can be heard for a considerable distance.

The Fijians are fairly expert sailors, although they never venture far from land. They make the usual dug-out canoes connected with an outrigger, and they use three-cornered mats as sails. They also make house boats, which are simply tow canoes lashed side by side, with a grass house erected on them.

I have never visited the Solomon Islands, and have only met some of the natives in Fiji, and I have never felt disposed to cultivate a very close acquaintance with them. They are mostly tall, forbidding-looking men, with a preference for a particularly gaudy sulu. They are notorious cannibals, and in olden days they had a regular trade in human flesh. Natives of the neighbouring islands were kidnapped, fattened, and ultimately slaughtered for the market. They are good sailors, make canoes 30 to 40 feet long, much carved and decorated, and these they use in their piratical expeditions. Their weapons do not differ from those of the other islanders, but they make very beautiful wicker work shields. Over the graves of their dead they erect grotesque effigies. They are much addicted to brass armlets, and the lobes of the ears are in many cases enormously distended to admit the introduction of a brass or copper ring.

A very different people from the Solomon Islanders are the Samoans; they have been well described as a "race of gentlemen." They are well proportioned, with brownish skin, straight hair, and a perpetual smile. Probably there is no race on the face of the earth upon which care sits so lightly as upon the Samoans; they have the happy knack of always looking on the bright side of things. They say of themselves, "We are always happy, we never grieve long about anything; we are not like the white people, happy one moment, gloomy another; we have no cares, the days are too short."

They usually wear a kilt of leaves, where, of course, it has not been superseded by Manchester calico, and the women are always decked with flowers. Flowers in her hair, flowers in her ears if they happen to be perforated, a huge sash of flowers or banana leaves worn over one shoulder and under the opposite arm, and a kilt of fibres make up altogether a most becoming costume.

They make exceedingly beautiful mats from Hibiscus bark, often of extreme fineness, and these are sometimes used for clothing, a hole being made in the centre for the head, and the mat falling over the figure like a cloak. Their houses are often large domed structures, thatched with grasses or leaves, and built upon an ingenious framework of wood. It is a curious fact that the framework upon which their domes are constructed is very much the same as that used by Sir Christopher Wren in building the dome of St. Paul's. The weapons, utensils, and paddles are of the usual Polynesian type, and hardly call for special mention.

The Tongans are a more mixed people than the Samoans, and are much more energetic and enterprising than the majority of the Polynesians. They are a race of boat builders and sailors, and, probably owing to the fact that the Tongan Islands are surrounded by dangerous coral reefs, they have become much more intrepid sailors than their neighbours. Their canoes are well-built craft, much carved, and their houses are the usual thatched huts.

The indigenous race of New Zealand—the Maoris—is by far the most intellectual and gallant of the races of the Pacific. In old times they were cannibals, but their cannibalism seems to have been connected with the belief—to which I have alluded before—that by consuming the flesh of an enemy, that enemy's good qualities were transferred to the consumer. Very often only the heart of the victim was eaten, the heart being supposed to be associated with courage; the left eye was also consumed, usually by the chief, as it was the seat of the soul. Further, it is recorded that sometimes, although these parts were offered as food, they were simply touched and not actually eaten. The Maoris have a high sense of chivalry, and mighty fighters as they are, they always fought fairly. It is on record that upon one occasion, when they were fighting with the British, they heard that the English were short of food; they sent a supply, told their enemies to make a good meal, and then come out and fight. We cannot imagine a German doing anything of the kind, and I have my doubts whether, under similar circumstances, we should have done the like.

The Maoris to-day have rapidly assimilated European culture; many of them have taken high honours at the various universities and have attained to distinction in many learned professions. Nevertheless, although the New Zealand Government does everything possible to protect them, they are gradually dying out, and it is to be feared that, like a much lower race, the Tasmanians, they will eventually be exterminated. They themselves realise this; they predict that "as the white man's rat has exterminated the Maori rat, as the white man's clover is killing the Maori ferns, so the Maori himself will disappear before the white man." One of the causes for their decrease in numbers is their liability to pulmonary disease, largely in consequence of their adoption of European clothes. A Maori will come into Auckland, for instance, muffled up in a great coat, and when he gets back to his village he will discard his clothes and wrap himself up in the native mats, and speedily sow the seeds of double pneumonia.

Naturally, their old arts and crafts are being lost, but there is abundant evidence that the Maori had attained to a high degree of civilization, to wonderful skill in the use of primitive tools, and had developed great artistic ability, long before they were discovered by the Europeans. Love of ornament is implanted in the heart of every man, cultured and uncultured, and the most striking characteristic of the old-time Maoris was the way in which they decorated their faces by tatooing. The practice has fallen into disuse, although to-day some of the married women have their chins tatooed, which at a little distance makes them appear to wear beards. The operation of tatooing was a long and exceedingly painful one, and sometimes it took two years to complete. The design was first drawn upon the face with pigment—or rather that part of it which could be completed at one operation. For puncturing the skin, an implement made from a piece of wood in which were inserted the teeth of same small animal was used; the points were driven in by blows of a light hammer, and the colour rubbed into the wounds. Inflammation was the invariable result, and if matters went well, in about six weeks the victim was ready for another instalment. During the operation the patient was surrounded and sometimes held down by the maidens of the tribe, who sang to him, and continually reminded him that although the operation was exceedingly painful, yet he would look remarkably handsome when it was finished. The various patterns on the face of a chief had some meaning, but I have never met any white man who could decipher it, and the Maoris keep their own counsel.

It is said that no two faces were tatooed alike, and a Maori who had once seen the pattern could always identify the individual. These patterns served as a sign manual—if I may use such a phrase in this connection—and a Maori would draw the pattern on his face as a sort of signature. A finely tatooed head was a prized possession, and upon the death of the owner it was not allowed to fall into decay. The head was severed from the body, the bones extracted, and the flesh dried, and so remained a precious heirloom in the dead man's family. There are some examples of these dried heads in the Bristol Museum.

In common with the rest of the Pacific Islanders, the Maoris, when they first came into contact with the Europeans, were in the stone age, but they were able to execute most wonderful carvings with their tough green-stone tools. The houses of the chiefs were usually of wood, and were adorned with most elaborate carvings. The patterns are in many cases exceedingly intricate, and grotesque representations of the human figure are common, and it may be noticed that very rarely—if at all—are there more than three fingers on each hand. The effect of these figures is in many cases enhanced by the use of the pawa shell for eyes. I am sorry to say that very often these figures are called idols, which they certainly are not.

The Maoris were famous boat builders, and the stern posts of their canoes were often most elaborately carved. There is one specimen in the Auckland Museum so beautifully wrought that I question if any one man could have completed it in the course of a long life.

The weapons of the Maoris were of wood or green-stone. The green-stone Maori meres are the most important of the Polynesian weapons, not from their size, but from the enormous labour involved in their production. The stone is so tough that to fashion a mere 18 inches long was the work of a generation; that is, of course, with the primitive methods of grinding formerly in use. It is a spatula shaped club with a sharp edge. The method of fighting with this club is worth mention. The front of the weapon was thrust into the neck of the enemy, and this caused him to bend his head either backwards or forwards, and in each case it was in a favourable position for the skull-splitting operations which followed. The meres were also made from wood beautifully carved.

Another peculiar weapon of the Maoris is the "patu." This was a hatchet-shaped implement with a bundle of feathers attached to it. These feathers were not there for ornament, but they had a distinct use; they were flourished in the face of an opponent, and so confused and partially blinded him that it rendered the succeeding stroke easy. One end of the patu was pointed, and this was also used upon a favourable opportunity.

It is a strange thing that the Maoris—as I have said, the most intellectual of the races of the Pacific—had no knowledge of bows and arrows, although they were used by many less developed races. The greenstone was also fashioned into ornaments, the most conspicuous being the little figure known as Hei Tikis. This is the Maori conception of the first man, and as usual the hand has only three fingers. They were regarded as charms, and held to be powerful bringers of good luck. They made spears 20 to 30 feet long; the trees were felled with stone axes, pieces split off and gradually reduced in girth till the desired size was reached. They were then scraped with a knife made of obsidian or volcanic glass, and finally smoothed with pumice stone. The taiaha is another characteristic weapon of the Maoris; it is often very elaborately carved, and it also served as a wand of office for the chiefs. Their river canoes were dug-outs; that is they were the trunks of trees hollowed out by fire and adzing. They had an ingenious method of increasing the holding capacity of these canoes; the inside being hollowed out was filled with water, which was heated by throwing in red-hot stones. This rendered the sides pliable, and while in this condition cross pieces were inserted, thus forcing the sides apart and so increasing the accommodation.

They wove very beautiful mats of exceeding fine texture from native flax; the best—kaitaka—was reserved for the men, and another quality—the korowai—was used by the women; and the ordinary costume consisted of these mats dyed in various colours and sometimes otherwise decorated. As a matter of fact, the Maoris were past masters in the art of weaving their native flax, and they distinguished some 50 or 60 different kinds which were used for specific purposes. The flax was woven into a coarse cloth, and feathers were often inserted, or they were covered with patches of dog skin. Sometimes they were covered with the stems of the flax, which made the garments resemble thatch. From this material was made their clothing, which consisted of two mats or flax cloths, one worn round the waist and the other round the neck. Men and women dressed alike, but the men fastened the upper mat on the right side and the women on the left. Their mode of salutation is somewhat peculiar; they rubbed their noses together—te hongi.

The Maoris are great singers and dancers, and some of their women have really beautiful voices; but as with all Polynesians, there is a vein of melancholy running through all their melodies. They have some characteristic dances. The Kaka-Kaka and Hulu-Hulu are specially noticeable.

Although not included in Polynesia—as I have already mentioned—I may say a few words on the indigenous race of Australia—the Black Fellows they are called. They are probably the most degraded, or at any rate, the most undeveloped race on the face of the earth. They are tall men, fairly muscular, and they vary in colour from dirty brown to an intense black;

as a matter of fact, the blackest man I have ever seen was an Australian native; he was so black that, as Mark Twain says, a piece of coal would make a white mark on him. To make their appearance impressive in their corroborees, they paint their bodies with white clay, often following the lines of the bones, and one can readily believe that on a dark night they might be taken for walking skeletons. They are quite unreliable, and liable to break out at any moment. Even after serving a white man faithfully for years, they may "run amuck" without warning, and often with disastrous results. They are usually armed with spears, formerly tipped with stone or flints, and now with any pieces of iron they can get. A black fellow upon meeting a white man in the bush will always drop his spear on the ground, as a token of friendship; but it is just as well to see that he does not pick it up with his toes, with the inevitable result. They use a throwing stick, which causes their spears to travel a greater distance and with greater force than would be the case without its aid. They have a distinctive weapon—so far as I know peculiar to Australia—the boomerang. It is a flat piece of wood describing a parabolic curve, flat on one side and slightly curved on the other. It has the property, when properly thrown, of returning to the hand of the thrower, and so expert are the Black Fellows in its use, that they can throw it past a mark and cause it to strike the object on the return journey. The throwing of the weapon by a Black Fellow is accompanied by much yelling and contortions of the body, and certainly he can make the boomerang perform the most extraordinary gyrations. I have never known a white man, no matter how long he may have practised, to approach a native in his ability to hurl the weapon. Another Australian weapon is the waddy, which is simply a stick with a knob at the end. It is used in hunting kangaroos, and as thrown by a native, it rarely miisses the mark.

Dwellings, except perhaps in the north, where the influence of the Papuans is apparent, they can scarcely be said to have, and even here they are huts made with branches of trees; more often they are mere wind shields.

They make dug-out canoes, which they fit with a primitive form of outrigger, but they are only used near the coast.

Low as the Black Fellows are in the scale of development, they perform some extraordinary surgical operations with sharpened shells. Blood-letting is common, and even such a delicate operation as trepanning is successfully performed by these people.

I have had the privilege of visiting a compound where the natives are under the charge of a missionary. They profess to be very religious, so much so that they will charge you 5s. on a Sunday for a boomerang which they would be very glad to sell for 2s. 6d. on Monday, and they decline to throw the weapon on that day if the missionary happens to be looking. In this compound I made acquaintance with the last remaining King of the Black Fellows. There was no doubt as to his identity. He had on his chest a brass plate, with his name and titles inscribed thereon—King Anthony Anderson, King of Moreton Plains, and the country round about—a sufficiently comprehensive title. He told me he was the last of his race, that his fellow monarchs had drunk themselves to death.

There must be real regret that such races as the Fijians, the Samoans, and the Maoris are passing away. Their old arts and crafts are even now things of the past, but sufficient examples remain to afford abundant evidence of their skill in the arts of life, and although these crafts will never be revived, they form an object-lesson to more civilized communities as to what can be accomplished by primitive people with very primitive appliances.

Aids to Teaching Climate.

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ESSENTIAL METEOROLOGICAL LAWS.

IN order that the climatic factors, or the influences controlling climate, may be understood, a number of meteorological laws must be held clearly in mind. Twenty-five such laws may be stated briefly as follows :—

GROUP I. TEMPERATURE.

1. The earth's surface is warmed chiefly by solar radiation, and to a lesser extent by radiation from the warmed atmosphere.
2. The earth's surface is cooled chiefly by outward radiation to the overlying air, which is thereby warmed and then usually rises, carrying the heat to higher levels, where it readily escapes to space. A secondary method of cooling is that which accompanies evaporation and thawing. A third method, radiation to space, is also important in high altitudes and in dry regions.
3. The lower atmosphere is warmed chiefly by the absorption of terrestrial radiation and to a minor degree by the absorption of solar radiation.
4. The lower air is cooled chiefly by convection, i.e., the rising of the warmed air, and subsequent radiation to cooler air and into space. It is sometimes cooled by radiation to cooler land or water.
5. Vertical rays from the sun are more effective in warming the earth than are oblique ones ; the more oblique the rays, the less heat is received. Rays which are reflected from the earth have no effect on terrestrial temperature.
6. As all atmospheric molecules and especially water vapour interfere with the passage of heat, the drier and the thinner the air the greater the heating by rays coming from the sun at a given angle, and the more rapid the cooling by night and in the shade.
7. Heat is carried from place to place mostly by winds and to a lesser extent by ocean currents.
8. Water warms less easily and more slowly than land, and cools more slowly because (a) the specific heat of water is about twice that of land ; (b) water is warmed to a greater depth, because of transparency and convection, and hence the surface layer is not warmed so much ; (c) there is more reflection from water than from land ; (d) there is usually more evaporation from water than from land. The slower cooling of the water is because of (a) and (b), and because water vapour and clouds are more abundant over water than over land. Water vapour and clouds hinder the escape of heat.
9. The temperature of an object increases until the loss of heat equals the addition of heat. When the loss and the gain balance, the temperature remains constant. When the loss exceeds the gain, the temperature falls. Therefore maximum temperatures occur after the time of maximum heating, and minimum temperatures occur after the time of maximum loss of heat by radiation. In other words, there is a daily and a seasonal lag.

10. Evaporation is a cooling process ; when condensation occurs, as much heat is released as was required to evaporate the condensed vapour. However, since most condensation occurs high up in the air where the heat can easily escape to space, the final result of evaporation is usually surface cooling.

11. Rapid descent warms air, while rapid ascent cools it. The adiabatic cooling of dry air while ascending is at the rate of 1 deg. F. for each 200 feet, approximately.

As a summary of these laws of heating, it may be well to picture the cycle due to their joint action. The sun rises ; its rays penetrate the air, but are absorbed by the dark soil, which thereby is warmed and gives out long heat rays, which are absorbed by the air. As the air becomes warm it expands. Winds are set up, and the heated air is moved away and warms other places where the sun's heating is less effective. Sometimes the air rises and is therefore cooled adiabatically, occasionally enough so that its moisture is partly condensed with a liberation of heat which still further warms the air. Gradually the heat escapes outward to space or downward to cooler earth and water until the air is no longer relatively warm. Then gravity pulls it down to the earth's surface, where it awaits another warming the following day.

GROUP 2. WINDS.

12. Relatively cold air tends to sink, and crowd under warmer air, thus forcing it to rise. This is because cooling causes contraction and warming causes expansion, and hence a given volume of cold air is heavier than a like volume of warm, expanded air.

13. Winds always blow from places of higher air pressure to places of lower air pressure, because the great force producing winds is gravity.

14. Winds are deflected by the rotation of the earth ; to the right in the northern hemisphere and to the left in the southern. The extent of deflection increases with latitude.

15. Winds blow at a large angle with the isobars if there is much friction and at a small angle if there is little friction. In other words, if there is little friction the air circulates around and around a centre of low pressure, while where there is much friction it approaches the centre of the low more directly.

16. Surface winds are influenced by topography and surface temperature. Winds tend to descend slopes, to follow valleys, to go towards warm areas, and to avoid elevations and cold areas.

17. Wind velocity depends on the barometric gradient, or difference in air pressure per horizontal unit, and upon the amount of friction ; the steeper the gradient and the less the friction, the stronger the wind.

GROUP 3. MOISTURE.

18. The ability of air (space) to hold moisture increases sharply with increased temperature, doubling with each increase of approximately 20 deg. F. (10 deg. C.). In other words, as the temperature rises the relative humidity falls ; this in spite of the fact that the absolute or actual humidity is increased with increased temperature whenever there is water which may be evaporated.

19. Atmospheric moisture is derived by evaporation from all moist surfaces, chief of which is the ocean.

20. The rate of evaporation increases with increased temperature and wind velocity and with decreased relative humidity. It is also increased slightly by decrease in air pressure, in absolute humidity and in the salinity of the water.

21. Atmospheric moisture is transferred chiefly by wind and the vertical moving of air called convection. (Diffusion, the other process of transference, is altogether subordinate).

22. Condensation occurs when moisture is cooled below the saturation point or dew point.

23. The amount of condensation depends upon the absolute humidity of the air, the amount of vapour cooled, and the extent of cooling beyond the dew point.

24. Precipitation occurs whenever drops, flakes or pellets are formed which are too heavy to be sustained in the air by the rising air currents.

25. Precipitation is heavy when a large volume of warm moist vapour is cooled notably below the saturation point.

As a summary of these laws of moisture, it may be well to describe the cycle often gone through. The sun rises over the ocean and the air is warmed. It thereupon becomes able to hold more moisture and evaporation is facilitated. As the air is blown over the moist surface, it takes up moisture, rapidly if it can hold much more than it already has, and slowly if it is nearly saturated. The wind blows upon the land carrying moisture from the ocean. It encounters a mountain range and is forced to rise. In doing so its temperature is lowered. At a moderate height it is cooled sufficiently so that it can no longer hold all its moisture and clouds form. At a higher elevation a drizzle is produced. If the range is high or if convectional overturning takes place, rain falls until the excess moisture has been precipitated.

HELPFUL CLIMATIC GENERALIZATIONS OR LAWS OF CLIMATE.

Generalizations as to the normal distribution over the earth of various climatic elements such as heat, wind, and moisture, are often distinctly helpful. Few teachers may think it wise to teach climate by the conspicuous use of zonal averages. They may think it unwise to ask students such questions as " What is the average temperature, relative humidity, precipitation, etc., at latitude 50 deg. N. on the continents? " There are strong arguments in favour of a concrete discussion of a climate as it actually is, instead of considering what it would be if various more or less local factors were not operating and making it peculiar. However, most teachers and prospective teachers are benefited decidedly, according to my experience, by having such generalizations clearly in mind.

The thirty-six climatic generalisations which I have found most useful are given below very briefly.*

GROUP 1. HEAT.

1. Half the earth is being heated at a given moment by the sun's rays, the great source of heat. Because of the earth's rotation there is a progressive change in the area heated.

2. Normal temperatures decrease with increase in latitude from an average of about 80 deg. F. near the equator to about 45 deg. F. in about latitude 45deg,, and to about 0 deg. F. near the poles, or at a rate of nearly 1 deg. F. for each degree of latitude.

3. Many places are warmer or colder than normal because of the influence of winds, as winds commonly affect local temperature. The

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*A very much fuller statement of these and of many other generalizations which seem less valuable for teachers has been prepared. It will be published soon in the Monthly Weather Review as " Laws of Climate." Citations to authorities are given in full in " Laws of Climate," and hence are omitted here.

effect is conspicuous along coasts where winds blow from the sea, near mountains, and in high latitudes. Winds from the ocean commonly warm cold lands and cool hot lands. For example, Ireland is called the Emerald Isle because winds from the ocean in winter keep it warm enough so that grass continues green. Winds from higher latitudes commonly bring lower temperatures, while winds from lower latitudes commonly raise temperatures. In other words, northerly winds are cool and southerly winds warm in the northern hemisphere. Rapidly descending air often warms by its dynamic heat. For example, chinooks or foehns frequently raise temperatures on the leeward sides of mountain ranges.

4. Normal temperatures decrease with increase in altitude, about 1 deg. F. for each 330 feet rise of the earth's surface. The fall in nocturnal temperature is at a somewhat greater rate. At an elevation of 2,000 feet above sea level the effect of altitude is appreciable, and at 4,000 feet it is marked.

5. Nearly all parts of the earth, except the polar regions, are heated for a short time by the sun and then are cooled by nocturnal loss of heat.

6. Day and night vary significantlv in length near the solstices in middle and high latitudes. Long days make summer warmer and long nights make winter colder than they would be otherwise. The maximum disparity between day and night increases with latitude. It is slight at 30 deg. and extreme at the poles where day and night are six months long. At latitude 50 deg. N. July days average 15.8 hours in length.

7. Seasons of temperature occur in middle and high latitudes. In low latitudes all months have essentially the same temperature, while in latitude 50 deg. there is an average difference of about 45 deg. F. between the July and the January mean temperatures. Seasons are a result of the migration of the heat equator and associated climatic belts, which shifting occurs as the earth revolves around the sun. The shifting is produced by the constant inclination of the axis to the plane of the earth's orbit and by the axis always pointing to the same part of the heavens.

8. Land is notably warmer than ocean or deep lakes in warm regions and in summer. It is cooler in winter. Land is cooler than water at night and warmer by day, except where the winters are cold, in which case land is cooler than water even by day. Europe affords good examples of the seasonal relationship. Between 47 deg. and 52 deg. N. for each 10 deg. of longitude farther from the west coast there is an average decrease of 3.1 deg. C. (5.4 deg. F.) in winter, but an increase of 0.7 deg. C. (1.3 deg. F.) in summer.

9. Daily range of temperature increases with decrease in the influence of oceans and lakes, as does also seasonal and annual range. Marine climates have slight range, while continental climates have great range. The air over the ocean normally varies less than 4 deg. F. from day to night, while the average range over the continents is more than three times as great, and in continental interiors it is often ten times as great.

10. Range of temperature increases with increased aridity upon the land. Deserts often have daily ranges of 50 deg. F. ; humid areas seldom have a range of more than 30 deg. F. and commonly have less than 20 deg. F.

11. Variation in temperature among the days, months, seasons, and years increases with latitude up to the polar regions. In low latitudes all days and years are much the same. In middle latitudes no season or year is " normal " and there are great contrasts among successive days. This variability is illustrated by Hann's statement that the average of forty years in Europe would not be any closer to the mean than the average of two years in Java.

GROUP 2. WINDS.

12. Surface winds often blow from colder areas to warmer areas because warm areas usually have lower air pressure than nearby colder areas. The trade winds, land and sea breezes, monsoons, and valley and mountain winds all illustrate this principle. Poleward blowing winds accompanying cyclonic storms form the great exception to this rule.

13. A great system of winds (the planetary circulation) results from the combined influence of intense equatorial heating and of the earth's rotation. High average temperatures produce a belt of low pressure along the thermal equator. A belt of high pressure is produced, chiefly as a result of the earth's rotation, in latitude 30 deg. or so north and south. From the higher parts of this belt, winds blow towards the heat equator (the trades) and spirally towards the poles (the westerlies in part).

14. Wind direction aloft is more to the right than nearer the surface (see Meteorological Law 15 above).

15. Average wind velocities increase with latitude to about 50 deg. N. and S. with an increase in the average vertical temperature gradients ; that is, the difference in temperature between the surface air and that, say, a half mile above the surface. Storminess also increases in general to about those latitudes, and storms help increase the wind velocity.

16. Surface winds average stronger over smooth regions than over less smooth in the same latitude. The surface wind velocity over the ocean averages twice that over the land.

17. Wind velocity normally increases with altitude. This increase is rapid immediately over an area of much surface friction and less rapid over an area of little friction. On the average in the open in eastern United States the wind velocity forty feet above the surface is five miles per hour more than at five feet above the surface.

18. Wind velocity averages greater in winter in mid-latitudes than in summer because of steeper temperature gradients, increased storminess, and lessened surface friction.

19. There is commonly an increase in velocity of surface winds during the day until the time of greatest convection, which usually is about 3 or 4 p.m. This is because the vertical movement of the air known as convection knits the surface layers with the rapidly moving ones above, which can thus drag the lower air along. In many places the velocity averages twice as great in mid-afternoon as in the early morning. At Kew, England, the average daily range is six miles per hour in summer.

20. Calm nights are characteristic of trade wind deserts and other deserts, and are common elsewhere on the land, particularly on warm lands Calm nights are abnormal upon the sea, because little nocturnal decrease in temperature and hence in convection occurs there.

21. The ocean is the great source of atmospheric moisture. It covers four-fifths of the warmer half of the globe, in which half more than three-quarters of the total evaporation takes place.

22. The rate of evaporation falls off with increases in latitude and altitude and with approach to marine conditions. On the average, evaporation from water bodies exceeds precipitation in low latitudes. It exceeds it greatly in the trade wind belt, where 150 inches or more evaporates from the ocean. On the average, precipitation exceeds evaporation in high latitudes (see Meteorological Law 20).

23. Windward sides of continents and mountain ranges are much more moist than lee sides (see Meteorological Law 21). The relative humidity on windward coasts approaches 85 per cent., while on the lee of mountain ranges it falls off to 50 per cent. or less.

24. The average actual or absolute humidity decreases with increase in latitude. Water vapour makes up an average of 2.63 per cent. of the surface air at the equator, 0.92 per cent. at latitude 50 deg. N., and 0.22 deg. at latitude 70 deg. N.

25. The ABSOLUTE humidity commonly increases with the temperature during the day and in the year, while the RELATIVE humidity averages least in the warmest hours in the day and in the warmest months of the year. This is because of Meteorological Law 18.

26. The products of condensation (dew, frost, fog and cloud) are most frequent and widespread wherever and whenever cooling involving the saturation or dew-point occurs oftenest.

27. Condensation is heaviest in warm, moist regions. Hence, dew increases in amount and clouds in density and thickness with decrease in latitude or aridity. In middle latitudes heavy dews seldom exceed 0.01 inch of water, but in the rainy tropics they sometimes exceed 0.1 inch. In polar regions the clouds are usually thin, while over the equator they are very dense.

28. The amount of precipitation decreases irregularly with increase in latitude, from an average of about 100 inches along the equator to less than 10 inches in the polar regions. (Parts of the trade wind belt are dry, but other parts—windward slopes—are very wet).

29. Variation in the amount of precipitation from season to season and from year to year increases in intensity with increased aridity. Disastrous floods are almost more common in deserts than they are in rainy regions.

30. The distribution of precipitation throughout the year depends on (a) intensity of convection: most areas have most rainfall when convection is greatest; (b) wind direction: winds from the sea and from lower latitudes bring rain; (c) comparative temperatures of land and water: in general, precipitation occurs on the land when it is cooler than the water; (d) storminess: storms induce a large share of the precipitation of storm-affected regions.

31. Two diurnal maxima and two minima of precipitation occur. The maxima are at 2 to 5 p.m. and 3 to 6 a.m.; and the minima are at 9 to 12 a.m. and 11 p.m. to 2 a.m. Some places have their maxima in the afternoon and others in the early morning.

GROUP 4. MISCELLANEOUS.

32. The temperature often seems warmer or cooler than the thermometer indicates. Sunshine and calm feel notably warmer than shade and

wind. Dry air feels warmer than moist air below about 50 deg. F. Above 55 deg. F. moist air feels the warmer.

33. Air pressure decreases with increase in altitude. At 5,000 feet the deficiency of air pressure has appreciable effects on some climatic elements, particularly on the rate of cooling in the shade, and directly on a few people, making them nervous. At 10,000 feet the deficiency is noticeable, and at 15,000 feet most men are strongly affected, being made dizzy and weak.

34. Many mountain valleys and lee slopes have a peculiar climate because of foehn or chinook winds. Temperatures and sunshine average abnormally high in such areas.

35. Cyclonic storms are frequent in mid-latitudes and dominate the weather there. They are great whirls, a thousand or so miles across, which move eastward at a rate of usually about 400 miles a day in summer and 800 miles in winter. They produce striking changes of weather. The " lows " cause precipitation in wide areas where precipitation would be scanty otherwise.

36. Typhoons or tropical hurricanes are whirling storms which occasionally powerfully affect wide areas near the margins of the tropics, causing much precipitation and destructive winds.

FOOTNOTE REFERENCES.

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Mr C. H. Cox, Orrell, Wigan, has a copy of the " Times Atlas," complete to date in leather binding case for sale. Apply direct to him.

The Riddle of the Exchanges. 1921. 16 pp. 1s. Publ. Mitchelson and Co., Stock Brokers.

This little book rather misses an opportunity of expounding the exchanges and their recent sensational variations to the plain man. The list of exchange rates in a good daily paper can be made of great interest for teaching purposes. The immense rise in value of Chinese money during he war, followed by a marked fall to below pre-war average, reflecting the fluctuations of silver, is a phenomenon the roots of which work back through centuries of trade with the Monsoon Lands. Norwegian, Danish, and Spanish money, at a premium during the war, are now slightly at a discount, whereas Sweden and Holland, with a stronger economic position, have their currencies still at a small premium. Italy, with labour and coal troubles, showed war impoverishment sensationally in the decrease of her currency to one quarter of its value, but the country's powers of recuperation are beginning to tell. France, the great sufferer, is struggling to right her currency, and Belgium keeps about level with France in this respect. Greek money has declined violently since Venizelos retired. Finland and Serbia, though depressed, keep above the ruinous level down to which Central and East Central Europe has for the most part sank. English money is struggling up slowly in North America and has regained its position in South America. But the book under review, instead of following the reasons for this, gives only a few general statements, and then proceeds to the undoubtedly very true doctrine that the one remedy for the disorganization of exchange is general disarmament.

The Position of Geography in Canada.

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AT the request of the National Council of Education which met at Winnipeg in 1919, McGill University undertook to make a Survey of Textbooks of Geography used in Canadian Schools. It was the writer's privilege to be appointed a member of the Committee chosen by McGill University to make this Survey, and he feels that it would be of interest to teachers in general to have presented to them the main facts of the report, which has just been completed.

It has to be remembered that the school system of Canada is vastly different from that in England, and it is modelled more after the American method. Every Province has control of its own educational system, each has public and high schools, a uniform course of study and a uniform system of text-books. In Ontario this uniformity is carried to the extreme. There every school has the same examination paper at the very same time, and everything depends upon examination success. In none of the Provinces, except Ontario, British Columbia, Saskatchewan, and Alberta, is attendance compulsory.

Quebec, however, differs from the other Provinces, in that there are two parallel systems. The one, Roman Catholic and French speaking ; the other, Protestant. Each Committee maintains elementary (one teacher), model (more than one teacher), and high schools, but the religious division determines every detail of administration.

In some Provinces, it takes the pupil 11 years to pass through the complete school system ; in others it takes 12 years.

Our Survey showed that there were 17 textbooks authorised for use throughout the Dominion. Eight of these, written in French, are for the Roman Catholic Schools, while two are for the Protestant Schools in Quebec.

Although eight appears to be a good number to be authorised by one Committee, yet some are but reprints with slight variations and designated ' élémentaire,' ' moyen,' ' moyen et supérieur,' thus determining the grades in which they are to be used. Three different Orders of Priests are the authors of these books. Unfortunately they are without exception quite unsuitable for the teaching of geography.

Of the two used in the Protestant Schools of Quebec, the ' New Elementary ' is used in all grades from IV. to VIII. It contains practically no physical geography, and the descriptive part consists of a cataloguing of facts with no explanation of any kind. The book is hopelessly out of date, and its maps are decidedly poor.

It should be explained that all maps required are bound in with the texts in all books. Owing to expense, no separate Atlas is encouraged.

In the Quebec High Schools (Grades IX., X., XI.), Macmillan's Complete Geography is used. It contains much more detail—in part quite unimportant—than the pupil can possibly grasp. There is throughout a general ignoring of " cause and effect," while the maps are poor, small, and out of date.

In Nova Scotia, we found Calkin's The World, and though dated 1919' the series is typical of the ' old school '—just bare statements of fact unfortunately too often incorrect.

Of all the texts, that used in Ontario is the best. In it, however, are types of two sizes, the intention being that only those parts in larger type shall be studied in the Public Schools, and the remainder left until reviewed in the first year classes of the High Schools.

The same book is used in British Columbia with a different cover, and is called the DOMINION SCHOOL GEOGRAPHY. It would not do to use a book in one Province with the name of another.

Other books reviewed are far from satisfactory. Indeed it may well be said that, in general, the geography books used in Canadian schools are not worth the paper they are printed upon. The treatment is antiquated in method and harks back to the days when geography was looked upon as an exercise for training the memory, when the now obsolete faculty psychology was in vogue. One is struck by the great cataloguing of names of towns, etc., and by the over-stressing of unimportant detail presented in an uninteresting manner.

Then the fact that the maps are incorporated in the text means that they are seldom used, because they are of no value owing to lack of information called for in the text, or to lack of clearness due to the poor quality of the paper used.

The reader should not conclude that Education in general in Canada is at a low ebb ; it has to be remembered that this Survey has to do with geography texts only. For eight years the writer has taught in the Province of Quebec, and he can speak in high terms of the liberality of the authorised Course of Study for Protestant Schools and the efforts of the Committee to raise the status of the schools and of the teachers. Indeed in many ways the work is as superior as that in the best of the English Secondary Schools. Geography, it happens, is an unfortunate subject in Canada.

In view of our findings, we suggested that the needs of Canadian Schools would be best met by adopting a series of progressive books, rather than one book to be used throughout all the grades.

An outline of the suggested scheme is as follows :—

Grades I.—IV. : Fairgrieve and Young's Human Geographies with oral lessons.

Grades V.—VIII. : Inasmuch as the majority of children leave before the viiith grade, it seems that the instruction should be as complete and as general as possible. We therefore suggested that a book be prepared treating the World broadly, with Canada as the background. It is essential for the unity of the Dominion that the many foreigners be integrated into the ideals of the land, and that geography be treated as a social science rather than as a physical science.

Grades IX.—XI. : In the High School grades, the pupil should apply the principles acquired in the lower grades to particular countries and problems, and he should treat the subject scientifically with the view of a possible University Matriculation examination.

The question of the uniformity of text-books is vital and delicate in Canada. At present each Province is a " law unto itself." An exchange of books, teachers, and methods is not encouraged. Especially is this true for Ontario, which is very proud of its system.

As geographers, we consider that the youth should be trained as Canadians and not merely as citizens of one particular Province. The weakness of the Province as a unit is apparent when one realises that the majority of the population are earning their livelihood and have their homes in Provinces far remote from that of their birth or school days.

As things are at present, a vicious circle surrounds the geographer in Canada. Everybody knows that the books in use are unsatisfactory, yet the publishers will not print a new work unless they have a guarantee that some Province will authorise the text, and a committee will not authorise a text unless the book is submitted to them in complete form.

To give a very needed stimulus, geography must be accepted as a subject worthy of study in Canadian Universities. With the exception of a little physical geography for geologists, geography is absent in every University. The provision of suitable textbooks will not in itself solve the problem the Committee of the Survey was requested to investigate. What Canada wants is properly qualified teachers who can interpret the books to the children, and who are competent, when necessity arises, as it often must, to amplify the information contained in the texts. There are no such teachers, not necessarily because they are disinterested, but because there is no recognition and no encouragement of the subject in higher quarters, and consequently there is no provision for them to receive the necessary training.

Is it to be wondered at that the writer's attempt to introduce the Geographical Association to teachers in the Province of Quebec was met with luke-warm interest? Further, townships are so scattered and distances are so great even within one Province, that teachers on their meagre salaries cannot be expected to attend centres for an exchange of ideas. All that has been done so far was to persuade the authorities of McGill to accept Geography as an optional subject for the matriculation examination.

[Thanks to the subsequent efforts of Miss M. V. Couser, 398, West Hill Avenue, Montreal, a branch of the Association is being formed in Montreal. Will all Canadian readers please communicate with Miss Couser and start other branches as may be deemed appropriate?]

Racial Factors in Democracy. P. A. MEANS. Boston, Marshall Jones. 1918. 8 vo., 278 pp.

The author starts with a brief survey of cultured evolution on a time basis, and we note incidentally that for him Elliot Smith is merely a "romantical pseudo-scientific" worker so far as American antiquity is concerned. Our author will have it that the higher civilizations of native America, in Mexico, Yucatan and Peru are purely American; other students may think this a case of superfluously romantic patriotism. Suggestive chapters follow, and this is a subject of the utmost importance for the geographer who wishes to understand the meaning and influence of human intercourse. As the author well says, the future of civilization depends more and more on the conscious, deliberate, and willing interchange of ideas. Some of the author's comments, e.g., on Germany, might be dismissed with a smile did one not feel that there is so much insensate prejudice in influential circles; but his reflections on French, British, Japanese, and American administration of other races will be found suggestive.

Man and his Past. O. G. S. CRAWFORD. Oxford Press, 1921 227 pp., royal 8 vo. Map and illustrations. 10s. 6d.

The archæologist to the Ordnance Survey, well known for his work on geographical aspects of archæology, gives us in this book an interestingly written account of his ideas on the methods of geographical archæology, evidently in the hope that his readers may take up the study of man in his relationship to his environment in the past, and not rest satisfied with the description or even the cataloguing of finds. The workers in this promising field of research are few, and the little that has as yet been done goes to show how valuable are the results that might be achieved and how interestingly they might be made to bear upon problems of the human geography of our own time. Mr Crawford's special plea for the construction of maps showing the natural vegetation of a country like England is one with which every geographer who wants to understand the evolution of British life will sympathise. We should much like to see work of this kind taken up all over the country by the branches of this Association, and can assure anyone who may be interested that every effort will be made by our Research Committee, of which Mr Peake is chairman, as well as by the Central Office, to help serious workers.

Some Thoughts on the Development of Schemes of Geography for Continuation and Secondary Schools.

By W. H. Barker, B.Sc.

IN the national scheme of education, the work of the secondary school carries forward and enlarges that of the elementary school, and prepares for the more intensive academic study of the university. A scheme of geography should therefore take cognizance of the work done in the elementary schools, and co-operation between the teachers is desirable, while care must be taken that the course does not leave the impression that the possibilities of geography have been exhausted by a regional study of the world, but that it has laid the foundation for a close study of man in the fullest sense and widest application.

In the elementary school, the aim is to make children familiar with the scenery and activities of their own county and region, to note the effect—based largely on the major natural regions of the world—of environment on both simple human societies and modern advanced peoples, and to acquire some practice with the tools of geography—maps, diagrams, etc.

At present there is no body of experience to determine what is best in the Day Continuation School. There are a number of factors not present in either an elementary or secondary school which necessitate great care in developing a syllabus. That which combines a course of history with geography will perhaps produce the best results, partly because the work can be made intensely interesting, partly because it breaks away from the traditional methods of "school," but above all because it can be made to appeal to minds just opening to a larger world and, being more mature, are able to formulate opinions and to accept responsibility. The following are two suggestions in outline :—

A. i. The Old World Island—geographical conditions affecting the migration and settlement of peoples ; the 'farmer' life of S.E. Asia and N.W. Europe, the nomad and trader life of the steppe belt ; the rise of early civilizations and regions of strife.
   ii. The effects of geographical discovery during 16th and 17th centuries—colonisation, exploitation, international conflict ; the new value of colonies in the modern industrial world.
   iii. The World Ocean and its peripheral lands—the study of the world and its peoples as mutually dependent and all contributing to the world's welfare.

A less ambitious scheme might be based on a well thought out course on modern problems :—

B. i. The new States of Europe.
   ii. The new China.
   iii. The new tropical Africa.
   iv. The new Britain ; etc., etc.

In the secondary school, the problems are altogether different. A full and sound four years' course can be drawn up without the cramping conditions of either the elementary or the continuation schools, though even here it is not only advisable but necessary to work in conjunction with colleagues responsible for other subjects. Unfortunately, there are still in existence teachers who imagine that the scheme must be dominated by the special requirements of the school-leaving examination. A pupil should be able to take his examination "in his stride" and not be crammed for it particularly in the year preceding the examination. In a sound scheme, during the four year course the world will be studied twice, and physical geography will be incidental to and explanatory of the regional and human geography.

The early years are the most difficult, especially now that children come in at the age of eleven years. Too often their geographical knowledge is deficient, and almost always it is necessary to present old ideas in a new aspect, and so ‘ orientate ’ previous work to the special requirements of a secondary school. The study of the home region is strongly advised, because it enables the relation of geography to other subjects to be so well developed —political, social, and economic history ; soils, natural and cultivable vegetation ; sites of towns and villages ; means of communication, occupations, and indeed all that goes to make the modern life of the district.

From the home region the study may expand to a geographical description of the British Isles, followed by a study of the world, mainly as an environment study of the major natural regions, with simple deductions and associations of industries, trade routes, and markets. In the elementary schools these form the *object* of the school course ; in the secondary school they are the preliminaries, the preparation for the work of the four-year course. The elements of physical geography, maps and map reading have been given in the early years, but after the age of 12 or 13, these are *used* and not merely studied. Pupils must become familiar with the *writing* of geography—the making of maps and diagrams, of graphs and charts embodying ideas as they are taught—and realising that geography has a definite and technical method of expressing all forms of data.

The last three years (i.e., ages 13—16) are perhaps best utilised by a regional study of the world, in which the first division is made by continents, the sub-division generally by climate ; e.g.

i. The Southern Continents.
ii. Eurasia and North America.
iii. British Isles and the development of the industrial region centering round the North Atlantic.

The special feature of this is that in the study of the Southern Continents, the climatic regions are not only well developed, but the influences of environment are well marked. Here, too, modern developments are following lines easily explained and demonstrated.

Eurasia enables the more simple study of the southern continents to be carried a stage further by a study of continental conditions and the development of (i.) the monsoon lands, (ii.) the “ heartland,” and (iii.) Europe and the lands of the Mediterranean. The study of the discovery of the great ocean routes not only introduces the conception of the expansion of Europe and its domination of the world, but gives the opportunity of studying the great oceans and prepares the way for a more detailed study of Europe (including the British Isles) both in relation to the separate countries and to the European commercial development in extra-European lands.

The following scheme accomplishes the same object in another way, by making the four year course thus :—

i. The Americas.
ii. Asia and Australasia.
iii. Africa and Europe.
iv. The World (revision by discussion, and work essentially of the nature of a ‘ seminar ’).

It cannot be too strongly emphasised, however, that no scheme will be sound unless it has been thought out carefully by the teacher to meet the special needs of his own class, and he should avoid stereotyping the work, but effect in the scheme changes which experience and circumstances show to be desirable.

Finally, it is essential that the four-year course should pave the way for an advanced course in geography. Indeed, no opportunity should be lost in pointing the necessity for further study to utilise the work done in the school and to prepare for the university or the great world in which the pupil must take his part. The four-year course lays a solid foundation for the study of world problems, a sound knowledge of the whole world stage and all the actors, whatever their parts and places.

Articles on Geography in Advanced Courses are contained in "Geography in Education" (Philip and Son), and the "Geographical Teacher," No. 50, Spring, 1918. See also G.T., Nos. 51 and 52.

International Credits (The "ter Meulen" Scheme). Harrisons, 44, St. Martin's Lane, W.C.2. 6d.

This is a pamphlet for all who are interested in current affairs and in the complicated problem of the re-development of the world's trade dislocated because half the world is too poor to buy what the other half must sell if it is to live. The scheme is that the impoverished buyers' Governments will pledge national assets (capital or revenue) to an International Commission of the League of Nations, and will then be permitted to issue bonds. Each Government will be able to lend these bonds to its own traders, who can then use them as security to get credit from would-be sellers of goods. The Commission will administer the pledged assets, and so the security of the bonds is increased. The British Government says it will accept such bonds in return for exports, and so the scheme is likely to go some way to relieve the present crisis.

The Geographical Section of the Naval Intelligence Division of the Admiralty has continued the issue of its interesting books. One of the most valuable in an Atlas of Alsace Lorraine (I.D., 1211A.), with a fine collection of orographical, climatic, vegetational, historical, economic, and population maps, a treasury of reference both for the student of the region and for the geographer needing examples of imporant distributions and correlations between the human and the physical.

Libya (I.D., 1162, 7/6) deals with the Italian province of that name, and includes some references to Egypt and Tunis as well. A general account, well sub-divided, is followed by numerous route guides with useful notes, and there is a vocabulary at the end to help the traveller. Macedonia, etc. (I.D., 1114, 7/6), has a general introduction, including many first-hand climatological data, then follow the itineraries and a valuable gazetteer. Turkey in Europe (I.D., 1129, 5/-) is well illustrated with photographs and a map. The general discussion of the territory (including Thrace in part) takes up most of the space. Constantinople and Adrainople are specially treated. Bulgaria (I.D., 1155, 7/6) treats the still undiminished state of that name before the last treaty, and gives good space to a general description, valuable especially if its figures can be adjusted to the later state of things. The gazetteer is fairly full, and there are numerous illustrations. Greece, Vol. I., Mainland and some neighbouring islands (I.D., 1221, 10/6) has nearly 200 pages of general discussion, followed by annotated itineraries. Arabia, Vol. I., General (I.D., 1128, 10/-), is of the greatest value and interest, as it gives us facts about a region too often left blank by those who have not felt the fascination of Doughty's book. It does not give itineraries, but has a remarkable gazetteer of the tribes. Siberia and Arctic Russia (I.D., 1207, 7/6), Vol. I., General, also deals with an almost unknown land, and is simply invaluable. Norway and Sweden (I.D., 1214, 7/6) gives its larger half to a discussion of these countries, and the itineraries are reduced. Netherlands India (I.D., 1209, 10/-) gives a serious study of Java and the surrounding and related possessions of Holland. Used with a good Dutch key map to the Dutch Government Survey Series of the East Indies (procurable for about 5s.), this is again an indispensable reference work full of first-hand facts. It does not include itineraries. A bibliography is a good feature. Portuguese Nyasaland (I.D., 1161, 5/-) gives a hundred page account, followed by itineraries, bibliography, etc., with photographs and a map. Kenya Colony (I.D., 1216, 680 pp. and map, 7/6). Is broadly interpreted geographical survey. The detailed information concerning climate, vegetation, and native life is specially welcome, and much attention is given to possibilities of economic development. The Uganda Protectorate (I.D., 1217, 447 pp. and map, 7/6). Is on similar lines, with considerable expansion of the sections on native life and on physical geography. The two vols. (1216 and 1217) have 55 and 54 pp. of climatic statistics respectively. H.J.F.

A Teaching Suggestion : A Home-made Globe.

The following may be of use to teachers who, being in need of a globe to show some special distribution, are unable to obtain just what they want. A very small outlay with a little practical skill is all that is required to prepare a series of globes useful for class demonstration. First procure an ordinary football bladder, which will cost two shillings, and when inflated will have a circumference about thirty inches, and also sufficient linen to make a cover. The cover can be made in eight gores, and these should be cut from a paper pattern whose shape has been drawn according to the ' cosine rule ' for varying latitudes. Leave enough for turning in, and then machine the gores together to about latitude 80° N. and S. Cut these ends off, and machine in two circular caps, just as in the leather cover of a football. A small slit about two inches long must be left, say, ' in Antarctica ' for the insertion of the bladder, and this slit can be laced up again as in a football. A small hole either at the N. or S. pole can be made for the tube of the bladder, although this is not necessary. Insert the bladder, inflate either with a bicycle pump or the mouth, and then tie up the tube. If the tube has been left to protrude through a hole at the pole, a bit of lead pencil stuck in will act as a suitable plug. Then on the surface draw in pencil a few lines of latitude ; the seams will be meridians, and lightly sketch in the land masses. Colour the continents and oceans, and such a globe will be found useful. These are some of its advantages. It is cheap, light, unbreakable (if it gets punctured it can be patched) ; it can be carried in the pocket when deflated ; as many linen covers can be made as are required to show different distributions, but only one bladder need be purchased, and it can be suspended by a single thread (practically invisible) at any desired angle.

J. JONES,
Homerton College.

Citizen of the World Geographies. By J. F. UNSTEAD, M.A., D.Sc. " Europe of To-day." About 250 pages and 11 maps and diagrams. Sidgwick and Jackson. 1921. 4s.

The author's name is a guarantee of effort towards clearness, fairness, and accuracy, and one welcomes this pioneer school book on the new Europe from the pen of the Chairman of the Geographical Committee of the League of Nations Union. It studies natural regions as well as states, and the combined effect seems to be well adjusted to the purpose in view. Judgments on various aspects of the recent changes are kept quite subordinate, so that, though they may rouse criticism here and there, they need not limit the general utility of the book. The life and problems of the various peoples are sketched in an interesting way, even if there is still too much evidence of the rather out-of-date enumeration of productions, industries, and commerce, and not enough suggestion of the social evolution underlying industry and commerce. The teacher who wishes to follow up more closely the question of language, which has played such a predominant part in the rearrangement of Europe, should get " Les Langues dans l'Europe Nouvelle " from the famous pen of Prof. Meillet (Paris, Payot, 5 frs), and " Frontiers of Language and Nationality in Europe," by L. Dominian, in the series of monographs published by the American Geographic Society. Dr. Unstead gives the facts fairly, so far as they were settled at the time of the preparation of the book, and we should be glad to see a short statement, in this magazine or elsewhere, concerning subsequent settlements which are still altering details here and there. Dr. Unstead has found it necessary to reserve the treatment of Britain and Ireland for a separate book, which will no doubt be inspired by the same broadmindedness, but it is none the less regrettable that the pupil will not be led, as he might have been, to realise that, whether we wish it or not, we and our Irish neighbours are henceforth parts of Europe. Probably Dr. Unstead's chapter on Eastern Europe will be found the most useful of all in this praiseworthy contribution to the teaching of geography to the world's citizens of the next generation.

Quotations bearing on Geography selected from Renaissance Writers.

Collected by H. W. Howes.

JUAN LUIS VIVES.

(Born 1492).

De Tradendis Disciplinis.

" Pomponius Mela wrote on geography and hydrography, and Pliny should be further read from his fourth to seventh book. In these studies there is no disputation necessary ; there is nothing needed but the silent contemplation of nature. The scholars sometimes will rather ask questions than contend or dispute. There are some students little suited for the higher investigation of causes, namely, those who are of sluggish wits, who, so to say, let their heads drop down, because they cannot bear the bright light, e.g., the blear-eyed. There are also those students who will not, or through their condition of life cannot gain this deeper knowledge. Such students should stay at this point. . . . . The pupil should read Strabo, who wrote a description of the world and gave its history at the same time. Let him also consider the maps of Ptolemy, if he can get a corrected edition. Let him add the discoveries of our (i.e., Spanish) countrymen on the borders of the East and the West. Let him also read Aristotle on ' Animals ' and his pupil Theophrasus on ' Plants ' and Dioscrides on ' Herbs,' together with the commentaries of Marcellus Vergilius, who translated it, and the ' Corollaries ' of Hermolaus Barbarus."

" Then he (i.e., the teacher) will point out, so as to make all easy, those things which have connection with the subject-matter about which he is speaking : the city, mountain, river, fountain ; where is the site, how far distant from some well-known place, e.g., from the City of Rome, Athens, Rhodes, Jerusalem, from the Alps, the Pyrenees, the Nile, Rhone, Euripus, or from the Adriatic or Etruscan Sea ; what notable man the place has produced, what special products are to be found there, then if anything remarkable has happened in that place. An animal or plant or stone should be briefly described, and anything concerning its nature and qualities should—as far as is possible and in the most attractive manner—be noted and described ; whether it is rare or unknown in our district, and where it may it may be found, should be taught." . . . .

" Next let him consider those arts which belong to travel and conveyance, in which subject the horse, the mule, the ox and all kinds of animal that draw vehicles are to be considered. Next, navigation is to be studied. for that art deals with conveyance." . . . . .

" In the first place for history there is necessary a knowledge of places, without which it cannot be understood."

" The senses open up the way to all knowledge. There should be, in the first place, a general explanation, an exposition, or, as it were, a picture of the whole of nature, of the heavens, of the elements, and those things that are in the heavens and in the elements, in fire, air, water, and earth ; so that a full representation and description of the whole earth is included as in a picture." . . . .

THOMAS ELYOT.

(Born 1490).

The Governour (1531).

(Geography)—" to prepare the child to understanding of histories, which being replenished with names of countries and towns unknown to the reader, do make the history tedious or else the less pleasant, so if they be in any wise known, it increaseth an inexplicable delectation." . . . .

"There is none so good learning as the demonstration of cosmography by material figures and instruments." . . . .

"For what pleasure is it, in one hour to behold these realms, cities, seas, rivers, and mountains that scarcely in an old man's life cannot be journeyed or pursued: what incredible delight is taken in beholding the diversities of people, beasts, fowls, fishes, tree fruits and herbs: to know the sundry manners and conditions of people and the variety of their natures, and that in a warm study or parlour, without peril of the sea or danger of long and painful journeys. . . . . Cosmography being substantially perceived, it is then time to induce a child to the reading of histories." . . .

"I dare affirm a man shall more profit in one week by figures and charts well and perfectly made, than he shall by the only reading and hearing of the rules of that science by the space of half a year at least."

COMENIUS.

(Born 1592).

THE GREAT DIDACTIC.

"Nor may they (i.e., the pupils) be ignorant of the course of the world's history as set forth in the most general way; to this must be added the chief things in cosmography, as the rotundity of the heavens, the globe of the earth hanging in the midst, the movement of the ocean, the various straits of rivers and seas, the chief divisions of the world, the chief kingdoms of Europe; but above all the cities, mountains and rivers of their Fatherland and whatsoever is memorable therein." . . . .

. . . "As far as possible men are to be taught to become wise, not by books, but by the Heavens, the Earth, oaks and beeches; that is, they must learn to know and examine the things themselves, and not the observations and testimony of others about the things." . . . .

JAMES CLELAND.

THE INSTITUTION OF A YOUNG NOBLEMAN (1607).

"It is a great shame for a general of an army to be ignorant of the elevation of the Pole, the situation of shires and provinces, the diversities of climate, the length of days and nights, according to the parallels and meridians; not to know the temperature of the air, the quality of the earth, and many such things. As for astrology, I would have it hid from a young nobleman's eyes."

RABELAIS.

(Born 1483).

GARGANTUA.

"Let there be no history which thou shalt not have ready in thy memory; and to help thee therein, the books of cosmography will be very conducible. . . . .

"Now in the matter of the knowledge of the works of nature, I would have thee to study that exactly; so that there be no sea, river, or fountain of which thou dost not know the fishes; all the fowls of the air; all the several kinds of shrubs and trees, whether in forest or orchard; all the sorts of herbs and flowers that grow upon the ground; all the various metals that are hid within the bowels of the earth; together with all the diversity of precious stones that are to be seen in the Orient and south parts of the world; let nothing of all these be hid from thee." . . . .

Modern publications on Renaissance educators are:—Foster Watson, "Vives on Education" (Camb. Univ. Press); Woodward, W. H., "Education during Renaissance" (Camb. Univ. Press).

Ordnance Survey and Map Issues IV.

THE notes this time fall into two main groups, (1) new map issues, (2) geodetic levelling, and for the information under each head I am indebted to the Director-General of Ordnance Surveys, who has kindly supplied all the requisite material.

Maps.

One Inch Popular Edition (see page 154, "Geographical Teacher," 1920). The 65 maps now published complete the South of England and the Midlands as far north as Birmingham. In addition, the Isle of Man Sheet (No. 17) is now issued. This is the first complete contoured map of the island which has appeared, and the new plan of strengthening certain contours has been adopted (p. 24, G.T., 1921). The five sheets additional to those mentioned in the last article are 71 (Dudley), 72 (Birmingham), 73 (Market Harborough), 86 (Bury St. Edmunds), 108 (Southend).

It is anticipated that all sheets for England and Wales in this edition will be completed by the end of 1923, as a steady output of 30 new sheets a year is being maintained. So far the Welsh sheets west of Cardiff—Montgomery have not been published. A New Outline Edition (sheet lines and numbers as for the Popular) is being issued. The outline and water are in black, and the contours are in reddish brown. This edition will eventually supersede the Small Sheet Series Outline Edition. So far Sheets Nos. 76, 108, 115, 117, 125, 126, 134, and 135 (eight in all) are available. Thirteen others are ready to print and others are in hand.

Progress has been made with the One Inch Tourist Map. The following are ready:—Oban, Deeside, Trossachs and Loch Lomond, Scott's Country, Burns' Country, Rothesay and Firth of Clyde, Lower Strathspey, New Forest, Lake District, Snowdon (ten in all). The following are in course of preparation:—London, Exmoor, Dartmoor, Isle of Wight, Brighton, and South Downs. The sheets vary slightly in size and shape, but each covers an average of about 800 square miles.

The new layered quarter-inch for England and Wales (12 sheets) (p. 210, G.T., 1920) will be completed before this number of the "Geographical Teacher" reaches its readers, as the remaining sheet (No. 1) is to be published early in June, 1921. Arrangements have been made to issue flat cases containing sets of the twelve sheets. Scotland (nine sheets) has been commenced, and Sheet No. 6 is nearing completion. It is expected that the whole of the Scottish sheets will be ready by the end of 1922. N.B. Scotland No. 1 and England No. 1 are identical, so that the whole of Britain will be covered by 20 sheets of this very attractive map.

All future reprints of maps on the half-inch scale will have an improved road classification. First-class roads suitable for fast motor traffic will be printed in red. The following half-inch reprints have been so treated:—Hill Shaded Edition, Nos. 5, 12, 15, 16, 22, 27, 31; Layered Edition, Nos. 5, 17, 19, 31. Ten others are in course of preparation.

1/1,000,000 International Map. The Edinburgh Sheet has been drawn, and the engraving of it is now in hand. The London Sheet is being drawn for reproduction by heliozincography.

A preliminary notice of a new Physical Map of England and Wales for the use of students is appended. It will be layer tinted (green and brown) with contours at 200, 400, 800, 1,200 2,000 feet. Coast line and water will be in blue. Sufficient names (physical features and towns) will be printed in black for purposes of ready identification of localities. So far the drawing of the water and contours is completed. A description of the map will be given in a later number of the "Geographical Teacher." It is certain to be in great demand by teachers and students.

Geodetic Levelling.

The old initial levelling of Great Britain, on which all the Ordnance Survey maps altitude are based, was commenced in 1842 and completed in 1861. All lines were double levelled, and the network was adjusted as a whole by the method of least squares. The datum plane was an assumed value for mean sea level at Liverpool determined by tidal observations extending over about a week in 1844. (This has been found to be 0.65 of a foot below the mean level of the sea).

The importance of having a large number of bench marks on very stable sites was not fully realised at that time, and it has been found at each 20 year revision that about 25 per cent. of the bench marks have disappeared and that a great many of the marks remaining have altered in level. Accurate revision was therefore becoming increasingly difficult, and, in addition, the initial levelling is considerably below the standard of accuracy obtainable by present-day instruments and methods. The Director-General of the Ordnance Survey decided, in 1911, to carry out a new network of precise levelling and to connect the network to three tidal stations at Dunbar, Newlyn, and Felixstowe, fitted with self-recording tide gauges. The new levelling was commenced in 1912, and the final least square adjustment was completed early in 1921.

The resolution defining precise levelling adopted at the 1912 meeting of the International Geodetic Association was taken as the standard for the new work, and this standard has been maintained. It has been necessary to restrict the extent of the network to England and part of Wales and enough of the South of Scotland to connect to the tidal station at Dunbar. The bench marks at junction points of the network are of a unique type, being fixed in solid rock at the bottom of specially constructed pits, so as to render them stable and permanent. Second class bench marks, consisting of a specially designed gun-metal plate and bracket, have been fixed on the side of stable buildings at intervals of about a mile along the primary lines, and these flush brackets will be used as starting points for the secondary and tertiary lines of levels. The instruments used included the Zeiss level, largest size, with micrometer attachment, enabling readings to be made to the fourth decimal place of a foot. The staves were of a specially constructed type with the graduations on a strip of invar, fixed to the face of the staff and free to move with reference to the wood. These staves were used in pairs, and all lines were levelled forward and back on different days, and the readings were made in a definite order, so as to eliminate as far as possible all known causes of error. The systematic discrepancy between forward and back levelling was very marked, and this shows that a line of levels, no matter how carefully the work is done, can never give precise results, however often the levelling is repeated IN THE SAME DIRECTION. The only way to get precise results is to level the line in opposite directions, adopting the mean of the two levellings to obtain the relative heights.

WALLACE E. WHITEHOUSE.

A Tour of the Motherland. pp. 148. 5in. x 7¼in. 2s. 3d. Wheaton, Exeter.

This is a "first" geography of the British Isles, and the compiler's name is NOT given on the title page, but, on the whole, the book is fairly well produced. The illustrations and maps are satisfactory, and the statements are well selected, and the majority of them are correct. A few inaccuracies and ambiguities such as those on pp. 27 and 71 need revision. The language on occasion is more advanced than the material, and there is very little that is original in matter or treatment, but the book is safer than many on issue for this stage. W.E.W.

Population and Parishes in the Ravensbourne and Darent Basins.

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THE Ravensbourne and Darent Basins contain a variety of relief and soil that has considerably affected the distribution of their population. To mention the main features of the area: In the North is the Thames with its flood plain, rising sharply to the plateau of South London composed of sands, clays and gravels. On the edge of this plateau stands the clay mass of Shooters Hill. From under these newer soils, about six miles to the south, appears the chalk, forming the dip slope of the North Downs with its partial covering of brickearth and clay-with-flints. The plateau is furrowed by the valleys of the Ravensbourne and Cray, and completely cleft by the Darent Valley. South of the chalk escarpment lies the Gault Valley, and beyond that the dip slope of the Lower Greensand.

Most of this article deals with pre-war conditions of population, which, as Woolwich contains the Royal Arsenal, began to increase in that and the adjoining parishes as soon as war was declared. At Eltham and Crayford some hundreds of new cottages have been built; and this fact seems to suggest a permanent increase in the population of both these parishes, which I have attempted to estimate in compiling the population tables.

GENERAL DISTRIBUTION OF POPULATION.

The total population of the fifty-two parishes in 1911 was between half and three-quarters of a million, of whom about half live in the six river-side parishes of Deptford St. Paul, Greenwich, Charlton and Kidbrooke, Woolwich, Plumstead, and Erith. That is, half the people in a total area of over two hundred square miles live in about ten square miles, having been pulled downwards, so to speak, indirectly by the force of gravity to live and work near the Thames. The southward meanders of the river bring it close to the firm, dry soil of the South London Plateau, leaving almost the whole of the marshland on the north side; and at these points of contact between river and plateau fishing settlements very early arose. The names of Deptford, Greenwich, Woolwich, and Erith (? Aerhythe or Old Haven) suggest dependence on the river. Charlton, however, is different. It arose as the Ceorleton, on the plateau above the tidal marshes, under the protection of its Manor, and this part is still distinguished as Old Charlton from the modern manufacturing town on the river below.

Plumstead grew up where the little Plumstead river, tidal for a short distance. entered the marshes. Near by is a small patch of chalk which made a landing place for boats coming in with the flood tide from the Thames. The building of the river wall and the draining of the marshland left Plumstead stranded, and it remained a small agricultural village until nearly 1850. Its recent growth is chiefly due to the nearness of the Arsenal. The unpopulated parts of these parishes, in addition to the marshlands, lie along the edge of the plateau on which is a line of commons, on Shooters Hill, and in the marshy valley of the Quaggy.

Another belt of parishes and towns lies on either side of and in between the Ravensbourne and Pool valleys, leaving the low ground of the valleys themselves empty. These are Beckenham, Bromley, Catford, Lewisham, and Lee. The development of the first two towns is mainly modern, and depends on their dry, healthy position, made easy of access by a good railway service. Catford is at an old ford of the Ravensbourne, where the river bends close to some high ground on the west of its valley. Lewisham stands where the Ravensbourne is joined by the Quaggy. Lee is on a projecting spur of the plateau making dry land north of the Quaggy marshes.

The Cray valley is marked by a line of population most of the way from beginning to end. A road runs down the valley on its right side, at first near the river, but gradually getting farther away from it as the flood plain widens. The villages of Orpington, St. Pauls, and St. Mary Crav and Foots Cray are placed at cross roads. Foots Cray parish includes the good-sized modern town of Sidcup, built on the healthier ground above the valley. Lower down stands Bexley, an old bridge town where the road crosses to the left bank of the river, and a mile and a half beyond Bexley is Crayford, where the Dover Road crosses the Cray at an old ford.

The towns and parishes of the Darent Valley are divided into two sections by its gap just above which it makes its right angular bend. In each section most of the parishes lie at right angles to the river, and are more or less roughly bisected by it. The chief villages of the Upper Darent Valley, Westerham, Brasted, and Sundridge lie on the main road and close to the river. Below Sundridge the road and river become farther apart ; and Chipstead clings to the river. Each of these villages stands where the river is crossed by a road running from the Thames valley to the Weald. Westerham, the highest town, is the largest, as here the cross road is the main road from London to Newhaven. Riverhead village is on the road from London to Tonbridge, and where this is joined by the road from Dartford stands Sevenoaks. Placed a mile or so from the river and opposite its gap, Sevenoaks focusses the traffic of both the upper and the lower parts of the valley and that of the Gault valley from Maidstone as well ; it also commands roads southwards into the Weald, and north-westwards across the chalk escarpment to London. Moreover, its healthy and charming situation on the Lower Greensand dip slope has made it a favourite residential town, and it has a good railway service.

Riverhead is continued with very little break by Dunton Green, a modern village occupying the road as far as the foot of the North Downs, and depending largely on extensive brick and tile works, helped by local supplies of clay and chalk.

From Otford to Dartford the valley of the Darent is marked out by a line of villages. Five of the parishes, Otford, Shoreham, Eynsford, Farningham, and Horton Kirby, lie on both sides of the river ; the rest on one or the other side only. Eynsford, Farningham, Horton Kirby, and Darenth parishes make noticeable bends to the south-east ; this may be because the dry valleys east of the Darent lead up to the south-east. The eastern boundary of Eynsford corresponds very closely with one of these villages.

The villages of the Lower Darent lie more or less alternately on opposite sides of the valley, following the meanderings of the river as they bring it now eastwards and now westwards close to the higher ground and the road. But, the river being unnavigable, these villages follow not it but the cross roads.

Dartford is placed at the head of the Darent navigation, and where a sudden shallowing of the river makes the ford by which the Dover road crossed it. Here converged traffic from Greenhithe and Gravesend to follow the great road to London. This, combined with its water power, easy access to the Thames, and abundance of cheap land for factory sites and of raw material for the manufacture of cement, have made Dartford an important manufacturing centre.

On the Dover road west of Crayford are Bexleyheath and Welling, connected by tramway with Woolwich, of which they are practically suburbs. The road then runs over Shooters Hill, having at the top, where the clay has a capping of gravel, a fringe of modern houses, but no organised town.

Just over a mile south of the hill is Eltham, an ancient village and Royal Manor, though now largely modernised, on the road from Lee to Bexley. It is placed on the edge of the plateau overlooking the Quaggy marshes. To the north of Eltham has grown up recently Wellhall, a town of Arsenal workers, enlarged during 1915.

The rest of the people live in small villages scattered on the dip slope of the North Downs. Most of them are remote from either railway or main road. In the chalk parishes practically all the villages are on the higher ground, the valleys being empty, partly because they are steep-sided and partly because the brickearth on the uplands is fertile and less porous and dry than the chalk.

Population in Relation to Soil.

The Lower Greensand is very thinly peopled owing to its dryness and infertility and the height of much of it. The Folkestone beds have more people than the Hythe, probably because they are lower. Sevenoaks lies almost entirely on the Folkestone sands, so do Seal and Godden Green, and a few smaller villages. Ide Hill is the chief village on the Hythe Beds, except Westerham, and that has some small patches of valley gravel around it. Brasted, Sundridge, Chipstead, and Riverhead are wholly or partly on valley gravel which is fertile and waterbearing. Riverhead, as its name implies, has good springs.

The parishes of Westerham, Brasted, Sundridge, and Chevening are long and narrow, their shape being determined by the parallel arrangement of the local geological formations. Their northern boundaries coincide roughly with the southern edge of the Clay-with-flints ; their southern ones stretch into the weald ; and each of them includes from north to south an area of chalk, about a square mile in extent, for sheep pasture, a very narrow strip of Upper Greensand for arable cultivation, about a square mile of Gault clay for cattle pasture, some alluvium and valley gravel where the villages are built, three or four square miles of Lower Greensand for wood, and lastly some Wealden clay for wood or pasture.

The Gault clay west of the Darent bend has no villages except Dunton Green, which needs the clay for its brick and tile factory. Otford, Kemsing, and Heaverham are on the Gault east of the bend, but they stand where it adjoins the Upper Greensand, and may be supposed to be lighter than usual. Everyone of the Darent villages below Otford, all the Cray villages, and those in the dry valley of the upper Cray, are on alluvium or valley gravel or both. Of course the river was a great attraction in these cases ; but the presence of villages on the alluvium or gravel of dry valleys proves that not only the river but also the fertile alluvial soil was desired.

The Chalk, owing to its dryness and the thinness of its soil, remains to this day largely unpeopled. The only villages on it in this district are Hextable and Sutton at Hone, and of these the first is quite near some Thanet Sand, and the second near some valley gravel. The chief reason for the emptiness of the Chalk is of course that it is dry ; minor ones are that it is in many parts rather high and exposed, and that owing to the excess of lime in its thin soil, it is hard to cultivate.

The plateau brickearth is fertile and water-bearing, but it is rather high ; it therefore has a good many villages, but not very large or important ones. Its villages are Tattesfield, which is partly also on Clay-with-flints, Westerham Hill, Cudham, Knockholt, Knockholt Pound and Halstead, besides a good many scattered dwellings. The Clay-with-flints, like most clays, has few inhabitants ; its chief villages are Leaves Green and Downe.

Not many villages stand on the Thanet Sand, but that is probably because its comparatively small outcrops were greatly desired for fruit and hops. But parish boundaries are much in evidence on this formation. Of the patches of Thanet Sand between the Cray and Darent no fewer than fourteen parishes have a share ; and from the piece east of the Cray valley five parishes radiate something like wheel spokes. Dartford parish in particular appears to have made great efforts to reach the Thanet Sand. Sutton at Hone has a very large share, and this may account for Swanley, which is in that parish, having become the centre of the fruit-growing industry. The chief villages on the Thanet Sand are Farnborough and Swanley.

In general one may say the same thing of the parishes of the lower as of the upper Darent valley. They stretch across the river in order to have, besides a river frontage, as great a variety of soils, Thanet sand, chalk, alluvium, brickearth and clay-with-flints as possible ; and the same thing may be said of the Cray parishes which have long, thin belts of soils from Blackheath, Woolwich and Thanet Beds, valley gravel, alluvium and chalk, followed again by the Tertiary soils.

The water-bearing Woolwich and Blackheath beds are fairly well peopled, though in these days very largely with ex-Londoners. However, there are a good many old villages among or apart from the modern houses : Beckenham, West Wickham, Hayes, Keston, Bromley, Chislehurst, Welling, East Wickham, Eltham, Lee, and Mottingham. These same soils, high, well-drained, healthy and picturesque, have also several good-sized modern towns arranged in half a semi-circle from Beckenham to Belvedere, around London. Even in the eighteenth century many wealthy London merchants were making their homes here ; and with the opening of the various local railway lines the number of their inhabitants greatly increased. Plumstead and Woolwich also stand partly on the Blackheath beds.

The London clay to the present time is almost uninhabited. It has a few modern towns : a part of Hither Green, some houses between Lee and Grove Park, Well Hall, and New Eltham. Plumstead straggles across it up to Shooters Hill Road. West of the Ravensbourne, Forest Hill, Sydenham, and Penge lie on it, but in that area it becomes so extensive as to leave little choice.

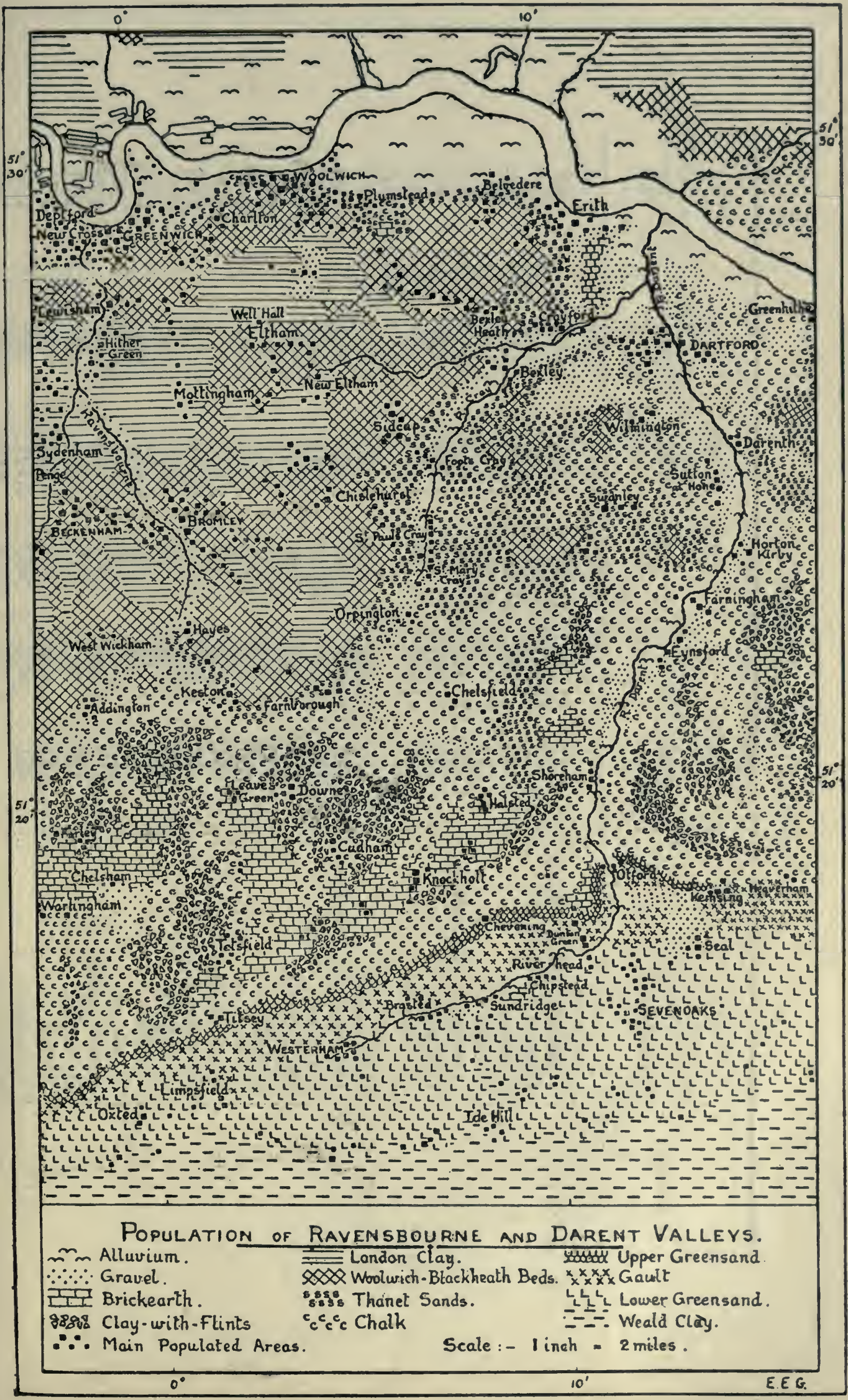
The Thames marshes have some small houses at Plumstead, but for the greater part they are used for factory sites and for the Arsenal.

Growth and Density of Population.

The data for the population tables are obtained from the one-inch ordnance survey map and the census report for 1911. I have allowed for the increase in population already mentioned at Eltham and Crayford, and for the extra people in several new roads at Hither Green.

In compiling the population tables I have attempted to distinguish between the inhabited and uninhabited areas, as shown on the ordnance map, and to calculate the density of population upon the former only, to avoid the false assumption that in each parish the people are distributed evenly over the whole area. Even so, one assumes (just as falsely) that the whole of the inhabited part of a parish is equally thickly peopled. This may be very misleading ; for instance, Lower Charlton must be about as thickly inhabited as Woolwich, while the upper part, Old Charlton, is still semi-rural.

The total population of each parish in 1911 is given in column 3C in the tables, but in cases where people living in workhouses, hospitals, or lunatic asylums form an unusually large percentage of the population, I have not reckoned them in calculating the density of population, as most of the people must belong to other parishes. Such people in Dartford parish make between one-seventh and one-eighth of the total population ; in Farnborough about one-third ; in Chelsham over a half ; and in Dareuth over two-thirds.



POPULATION OF RAVENSBOURNE AND DARENT VALLEYS.

POPULATION TABLES.

1. County,	2. Parish.	3. Population in 1801. A	1901. B	1911. C	4. Area in Acres.	5. Approx. Area inhabited. Acres.	6. Approx. Density of Population per Acre in 1911.
LONDON	Charlton and Kidbrooke	747	21,134	19,785	1,990	1,000	20
	Deptford St. Paul ...	10,615	110,398	109,496	1,563	880	124
	Eltham	1,760	7,226	20,450	3,760	1,135	18
	Greenwich	14,339	67,315	68,893	1,749	1,150	59
	Lewisham and Lee ...	4,383	127,495	160,834	7,014	5,404	29
	Plumstead	1,166	68,327	71,216	3,386	1,170	61
	Woolwich	9,826	41,625	36,710	1,130	560	65
						(South Woolwich only).	
KENT	Beckenham	955	26,288	31,692	3,890	3,000	10·5
	Bexley and E. Wickham	1,678	13,476	15,895	4,942	1,970	8
	Bromley	2,700	27,397	33,646	4,696	3,836	8·7
	Chislehurst	1,217	7,429	8,666	2,791	1,260	6·8
	Dartford	2,406	18,644	20,609	4,242	900	22 8
	Erith	909	25,296	27,750	3,859	1,360	20·4
	Foot's Cray ...	151	6,920	8,493	2,043	526	16·1
	Sevenoaks	1,403	8,106	9,182	3,259	1,110	8·02
	Chelsfield	605	1,522	1,790	3,378	700	2·5
	Cudham...	514	1,111	1,604	5,925	1,350	1·1
	Downe	217	610	649	1,652	270	2·4
	Farnborough ...	314	2,262	2,210	1,429	440	4·1
	Hayes	382	838	925	1,282	400	2·31
	Keston	183	832	986	1,487	260	3·7
	Knockholt	257	952	943	1,701	850	1·1
	Mottingham		1,332	1,534	642	200	7·6
	North Cray	192	661	655	1,484	320	2·04

KENT (cont.)	Orpington	693	4,259	5,036	3,517	550	9·1
	St. Mary Cray	672	1,894	1,857	2,028	370	5·01
	St. Paul's Cray... ..	263	1,207	1,467	1,654	210	6·9
	West Wickham ...	436	1,328	1,302	2,660	330	3·9
	Crayford	1,210	6,752	6,234	2,455	500	11·0
	Darenth	407	3,493	1,237	2,223	460	2·6
	Eynsford	841	2,004	2,147	3,544	400	5·2
	Farningham	397	1,328	1,286	2,739	380	3·3
	Horton Kirby	356	1,884	1,927	2,841	450	4·2
	Kingsdown	337	506	407	2,813	290	1·6
	Lullingstone	33	97	113	1,557	100	1·1
	Wilmington	520	1,932	2,227	1,718	520	4·2
	Sutton at Hone ...	690	4,650	5,541	3,625	1,300	4·2
	Brasted	750	1,304	1,396	4,449	730	1·9
	Chevening	756	1,074	1,039	3,893	850	1·2
	Dunton Green	In Otford Parish	927	1,411	1,026	200	7·05
	Halstead	145	595	560	923	280	2·0
	Kemsing	320	644	715	1,909	290	2·4
	Otford	*497	771	821	1,780	320	2·5
	Riverhead	750	802	899	1,106	380	2·3
	Seal	993	1,688	1,523	4,445	400	3·8
	Shoreham	828	1,515	1,490	5,599	610	2·4
	Sundridge	715	1,724	2,015	4,141	1,060	1·9
	Westerham	1,344	2,905	3,049	5,804	1,000	3·04
SURREY							
	Addington	178	642	614	3,604	140	4·3
	Chelsham	231	467	499	3,357	620	1·4
	Farley	95	119	98	1,051	250	·3
	Tatsfield	153	607	826	1,304	480	1·7

* Including Dunton Green

Column 3 in the population tables also shows the growth of population since 1801. In this matter Plumstead, which from a tiny village has become a large town, having actually multiplied its population by about 65, takes the first place. This, of course, is due to the development of the Arsenal ; and so is the growth of Woolwich. Erith and Charlton have also grown as riverside manufacturing centres ; Lewisham more as a London suburb ; Foot's Cray by the rise of Sidcup. All these parishes have increased their population 25-fold or more between 1801 and 1911. Deptford and Greenwich have grown much less, as they were large towns a century ago. Eltham, Bexley, Bromley, Chislehurst, Sevenoaks, and Orpington show a steady increase in their population mainly as residential areas, but Dartford, Crayford, and St. Paul's Cray more on account of their manufactures. These places have all increased 5-10-fold. The rest of the parishes have grown more slowly, as most of them are completely rural.

It is noteworthy that though these country parishes may be absolutely increasing in population, yet relatively to the larger towns their villages are declining. For instance, Otford which in 1801 had more than a third as many people as Sevenoaks, in 1911 had fewer than a tenth ; Horton Kirby and Dartford show an even more disproportionate change, and the same might be said of many other villages and towns.

Further, the population of some parishes shows a decline between 1901 and 1911 : Deptford, Woolwich, Charlton, and a good many of the country parishes are instances of this. In the case of Deptford this decrease is probably the result of the natural outward tendency from a congested area. A place seems to reach a high-water mark of population ; then the ebb begins. But at Woolwich, and perhaps at Charlton, it was most likely due to the discharge of thousands of Arsenal workers after the Boer War. During the recent war, Woolwich and the neighbouring towns have been crammed beyond all record. In the rural parishes the decline is a local example of the decrease in the rural population throughout the country.

In the parishes containing towns that are practically London suburbs, among which we may class Chislehurst and even Sevenoaks, the number of people per acre is much lower. Lewisham, nearest to London, comes first among these. Many of its houses are small and close together ; but Beckenham, Bromley, Chislehurst, and Sevenoaks have a good proportion of large houses and gardens, and open spaces in the towns. It is interesting to compare the density of Dartford with that of Sevenoaks at the other end of the Darent gap. Dartford, a manufacturing town, has 22.8 people per acre ; and Sevenoaks, a residential place, 8.2.

PARISH BOUNDARIES.

The parish in England was originally an ecclesiastical division of local development. In the early days of the Church, when the bishops' clergy were few, the lords of two or three adjacent manors would unite to build a church and support a priest to officiate in it. These local clergy, at first responsible to their patrons only, were by 800 A.D. being brought under the control of the bishops. Tithes of corn, fruit, wood, and animal produce were now payable to the incumbent ; and perhaps the obligation to pay tithes explains the very evident interest of the parish as such in questions of soil. In every locality the Church depended on the land ; therefore during the three hundred years after 800 A.D. while the parochial system of the country was in course of development, each parish would have an interest in securing the most fertile lands it could.

The parish boundaries were, to begin with, the outer limits of the group of manors forming the parish ; thus they often coincided with quite small local features. Many of the country parishes still keep their ancient limits. Roads are sometimes used as parish boundaries, though not much. The

Dover Road partly divides Greenwich from Charlton; it also divides Woolwich and Plumstead from Eltham, Crayford from Bexley, Greenhithe from Darenth. Other parts of Charlton and Eltham and part of Lewisham are bounded by roads; and so are parts of some of the chalk parishes, probably because of the lack of rivers. But as the parishes are older than most of the roads, they in general pay little attention to them.

Rivers are more used as boundaries than roads. Yet not even the Thames makes an unbroken line of boundaries, for Woolwich stretches across it into North Woolwich. Elsewhere the Thames is both parish and county boundary. The Ravensbourne, Quaggy, Cray, and Darent are all used to some extent as parish boundaries; but, as has been explained before, the general tendency is for the parish to stretch across the river. The small tributaries of the Upper Darent divide a good many of the parishes in that region.

Dry valleys have been used a good deal for parish boundaries in the chalk area; and the crest of the North Downs divides Cudham, Knockholt, and Shoreham from the Upper Darent parishes. But with the exception of Riverhead and Sevenoaks, which the Lower Greensand escarpment divides from Sevenoaks Weald, these parishes stretch, as before described, across that formation into the Weald.

Islands Far Away. A. G. King. pp. 248 x 2 folder maps. Publ., Sifton, Praed. 18s. A study of the Fiji Islands.

Very much has been written about the lawlessness and barbarism of the Pacific Islands, but little has been written about their good qualities.

Miss King's book opens the pathway to a better realisation of the wonders of these islands, and it is more interesting in that Miss King viewed her subject from an unbiassed standpoint. The introduction—written by Sir Everard im Thurn—places the reader in a good position for understanding the book. The author records a series of excursions and visits to places of interest in a beautiful and pleasing style. The customs of the simple native life delight a reader who is unacquainted with Pacific life.

Throughout the book one can see the effect of environment on the life of the people, and can connect their quaint beliefs and superstitions with the facts.

A great feature of this book is the numerous illustrations of people and objects which Miss King saw. The reader can thus have a clear conception of objects which it would be futile to try to describe. E.E.P.

Principles of Human Geography. Ellsworth Huntington and S. W. Cushing. Chapman and Hall, 1921. Royal 8 vo., 430 pp. Many illustrations. 21s.

This is a welcome attempt to treat of man in relation to the earth in general, to land forms, to oceans and inland waters, to soil and minerals, and to climate, to vegetation and animals, and it concludes with a short sketch of man's relations to man. It is easy to say that the book suffers from being a number of small notes on great subjects, though this is in part a legitimate criticism, but this, with all its drawbacks, provokes thought and criticism, and so helps the student very materially. Space might have been saved for fuller treatment of the human problems by acceptance of the idea that the physical basis is discussed in other books, but it is nevertheless interesting to have the physical facts sketched by writers who bring in references to humanity at every turn. The book is not an attempt to spread the senior author's special hypotheses about climate changes and climatic influence upon civilization, though his important studies of these problems are interestingly summarized in the proper place. Indeed, the geographer who is impressed with the fact that man's present relations with his environment in many regions are conditioned by his past relations, might feel that the author says far too little about the past. Those, however, who know Huntington's other work will see that the past as well as the present is continually in his mind. It will be grateful information for geographers that the book includes fairly long accounts of man's life and problems in the chief types of vegetation regions, though these accounts are not monographic like those of Demolins and Brunhes. Altogether it is a most interesting book, though we doubt whether it has given us the type of human geography book which will some day become dominant in our science.

Reviews.

Lands Beyond the Channel. By Sir H. J. MACKINDER. 11th Edition. 1921. pp. 304. 5in. x 7½in. 2s. Philip and Son.

This highly satisfactory and much needed text book has been subjected to a thorough revision, and is now completely up to date. Additional photographs have been inserted and new contour maps have been drawn to replace the less detailed coloured maps of the earlier editions. As the price is kept so low, perhaps the poorer paper and binding must be excused, but some of the blocks of the photographic illustrations used in the earlier editions are now so badly worn that an examination of their details is rendered almost impossible. W.E.W.

Outline Scheme for Local Surveys—from the South Eastern Naturalist. C. C. FAGG. 6d. (1d. postage).

This conspectus from such a well-known worker as Mr Fagg should be of use to many workers who are interested in developing their studies of their own localities beyond the chaotic stage of disconnected observations. Mr Fagg has developed a scheme for card-indexing, which is worth careful study and adjustment to diverse needs. The paper continues with an illustration of actual work done on the question of Surface Utilisation Surveys. Intending purchasers should write to Mr Fagg, and if they need a reply, must send stamped addressed envelope and queries on a sheet with space for the answers.

Illustrated Guides to the Battlefields. 3 New Volumes. 128 pp. 4s. each. Michelin Tyre Company.

The eleven earlier volumes were reviewed on page 52, Geographical Teacher, 1921. The features strongly commended in the earlier notice are prominent in these additional volumes; if anything, the new volumes are even better than the earler ones, though little opportunity for improvement seemed possible. (i.) The Somme, Vol. 2, deals with the second battle of the Somme, and has references to Amiens, Montdidier, and Compiegne. The historical section is excellent, and the photographs and maps are quite up to the high standard of Vol. 1. The remarkable map on page 53 is a novel feature. (ii.) Arras volume includes Lens, Douai, and the battles of Artois. The demolitions in this industrial area needed an actual visit for full appreciation, but the striking photographs obtained by the Michelin Coy. form a valuable permanent record of a district which is being cleaned up rapidly. (iii.) The Yser volume includes references to the Belgium coast. The "race to the coast" and the Zeebrugge action furnish material for stirring stories, and here again the carefully chosen and excellently reproduced photographs form a valuable addition. W.E.W.

The Gateways of Commerce: An Introduction to Economic Geography. By J. FAIRGRIEVE and E. YOUNG. pp. 272. 5in. x 7¼in. 2s. 6d. Philip and Son.

This is one of the volumes of the New Era Library, and we are informed that "this library is an attempt to meet the demands on the part of the general reader for works which are, frankly, merely introductions to the subject. . . They do not profess to be encyclopædic in character . . . and yet (are) so accurate that nothing has to be unlearned at a later stage." The present volume meets the demands set out above. Its price places it within the reach of the general reader, and it should prove popular in every sense of the word. It is not primarily a text book, but the writers have evidently kept in mind the possibility of the adopton of some such book for continuation school work. A large, perhaps too large, amount of material has been included, and, on the whole, it is pleasantly set out, though the phrasing at times demands a second reading, and even then the meaning remains obscure, e.g., "the LAND is the one and only source from which we obtain food, clothing, and shelter" (p. 1). "The great geographical conditions which were present before he (man) came remain as they were" (p. 12). [Man's absence or presence is surely a great geographical condition.] Page 25 has an awkward contradiction, so that the reader is in doubt as to whether Lake Vyrnwy is 68 miles from Liverpool or from Glasgow—as a matter of fact it is not 68 miles from either, and the 50 per cent. extra mileage (compared with a direct route) of the pipe-line in its journey through Malpas and Delamere Forest is a point of some economic importance. The book is well illustrated and has several good maps, though the contradiction between figures 30 and 34 should be noted. The are numerous examples of most interesting chains of argument, but the results are of varying value, and some of them are open to question, e.g., the IMPORTANCE of the "Manchester Guardian" in helping to fix the cotton industry in Lancashire, pp. 81 and 230; but these are minor points, and none of them detract seriously from a book which is very strongly recommended. W.E.W.

Commercial Geography of the World. By O. J. R. HOWARTH. 2nd Edition. 1920. pp. 304. 5in. x 7½in. 4s. Oxford Press.

The first edition of this book was published in June, 1913, and gained very favourable reviews. In this revised edition some of the text changes have regard to transport generally and to the economic conditions of those lands affected by the war. For obvious reasons the statistical summaries of the first edition have been deleted, and it is considered that the time is not yet suitable for the insertion of new ones. On the whole the text has been but little changed, nor was much change necessary. The great improvement consists rather in the replacing of many of the maps in the first edition by more carefully drawn ones. The new maps are a distinct improvement.

W.E.W.

Products of the Empire. By J. C. CUNNINGHAM. pp. 299. 5in. x 7½in. 5s. 6d. Oxford Press.

This is an inexpensive reference book which will be of great service to the teacher of geography. Many authorities have contributed to the material of the volume, but the author has done much more than to make a mere compilation of the facts. The arrangement of the book is logical, and the various descriptions are both concise and readable. Interesting details as to the meanings of names are given from time to time, together with extracts from writings touching on the subject, but which are seldom studied in this connection. Vegetable, animal, and mineral products all find a place, and many points with regard to the preparation of commodities for the market are given, together with photographs of trade processes. In the case of vegetable and animal products, some relevant particulars of associated climates and soils are included. The mass of detail is very large, and a rough check has failed to reveal any serious inaccuracies. The temperature of 60 deg. F. on page 14 should be 59 deg., and a statement might have been appended as to the importance of "actual" temperatures as against "corrected" temperatures for such statistics W.E.W.

The Progress to Geography (First Four Books). Edited by RICHARD WILSON. 5½in. x 7½in. Macmillan.

Stage I., pp. 144, 2/6. "Pictures and Conversations." The preface tells us that this book is the outcome of actual talks with children. The book itself admirably demonstrates this. One misses, with feelings of gratitude, the imaginary questions of an imaginary prodigy—one looks in vain for the ridiculous cross-examination which some books pretend to record as having taken place between mother and child or between teacher and pupil. The book is alive and so are the children—healthy, mischievous, real children. There is an absence of the "Shall I be an angel, daddy?" type, and one appreciates Dr. Wilson's real love for children and his understanding of the child mind. There are indications, other than merely the title, that he felt a deep respect for the work of Lewis Carroll. It is a reading book, and would be worth recommendation for that alone, but it is also a storehouse of the right kind of picture, many coloured and all admirably reproduced—beyond all this is the splendid demonstration of the successful teacher's attitude towards his pupil and his subject. A list of the topics under treatment would be unjust to Dr. Wilson, as it might give the impression that the book is incoherent, but it is not so in reality, and a final point of importance is that no attempt is made to explain EVERYTHING. There is something refreshing in the assertion that the small child must be taught some things dogmatically. That is certainly the experience of many parents, whatever assertions may be made as to cause and effect by schoolroom educators.

Stage II., pp. 176, 3/-. "More Pictures and Conversations." The method adopted in Stage I. is continued here with the necessary modifications required for the more advanced stage; much emphasis is laid on the geography of common objects, and the chapter dealing with salt is particularly useful. As in Stage I., the continuous use of the globe is advocated. The illustrations are again a good feature, and the poems quoted add to the value of the book.

Stage III., pp. 224, 3/6. "Myself and my Country." The broad groupings under such sections as food, clothing, shelter, transport, etc., and the novel picture maps, will prove attractive. A good case is made out for the treatment of the whole of the British Isles as a geographical unit at this stage, and the unequal treatment usually given to its separate elements is thereby avoided.

Stage IV., pp. 256, 4/-. "The British World." The treatment is broadly concentric from the home country outwards, and the book is well balanced. Relevant material dealing with lands outside the British Empire is introduced as occasion demands. The illustrations are well chosen, but there is no index, which might with advantage be added in a later edition.

W.E.W.

Life in Ancient Britain. NORMAN AULT. Longmans, Green and Co. 6s.

This book is a wholesome corrective for those who think that all material progress was made in the latter half of the nineteenth century, for those who think that history began with William the Conqueror, and even for those who think that intellectual advance began with the Greeks, while it is a wholesome delight for those who believe that to understand really adequately the geography that is now, a knowledge of the past is imperative. In form the volume deals with archæological matters; it ends with the coming of the Romans to Britain; but in effect it helps towards the understanding of modern conditions in a way that few history books do. Nor is it merely the material conditions which are dealt with, though the work is scholarly and accurate, for the writer again and again insists on the importance of the development of the mind of man. In Palæolithic time, "the most primitive of all civilizations, may be seen the first strands in the weaving of that web of the economic interdependence of society, which later on was to produce such wonderful patterns of human life—patterns of gold and duffel grey, of tinsel, and of drab." Or again, "if when thinking of the extent to which metal holds, as it were, together our vast, complex, social and economic fabric, we are convinced of the supreme importance of this discovery (of metal), yet we must not allow ourselves to be misled thereby. For, after all, the fundamental factor of human development is mind and not matter. And the more carefully we study these things, the more clearly shall we see that all human achievements—be they in stone or metal, in civic charter or universal suffrage—are of a piece and alike in being but manifestations of the growth of the spirit of man." Yes! Certainly a book that matters. J F.

Field Methods in Petroleum Geology. By G. H. COX, C. L. DAKE, and G. A. MUILENBURG. 305 pp. 5in. x 7½in. Flexible Leather. 24s. Mc Graw-Hill Publishing Company.

This is a recent addition (1921) to the Mc Graw-Hill series of books for field work. The book presents a concise and accurate account of the work of the petroleum geologist. Both geological and surveying matters have been handled by experts, and the volume will deservedly take premier place as the field pocket book on the subject. Instruments are well described, and actual field procedure from the identification of structures up to the preparation of the map and final report is systematically indicated. The excellent make-up of the book, including printing and binding, reflects the greatest possible credit on the publishers. Earlier books of perhaps more definitely geographical value, by the same publishers, are Pence and Ketchum's Surveying Manual (4th Edition, 1915) and Davis's Manual of Surveying (1915). Both books are carefully written, well illustrated, contain numerous field book examples, and have all the necessary mathematical tables. Either would serve admirably as a book for the reference shelf; the present price is 15s .and 18s. respectively. As is the case with the petroleum book, the general make-up renders them models of convenience for handling in the field.

W.E.W.

The Fall of Feudalism in France. S. HERBERT. Methuen, 1921. 280 pp., 8 vo. 7s. 6d.

This is in the main a contribution to history, but geographers will find it of value as a clue to many sources of information about France and about peasant life. Mr Herbert follows out the peasant risings and the means whereby the economic privileges of agrarian feudalism were abolished and the peasants' hold on the land was affirmed. As the development of a privileged class, passing into two classes, a "noblesse de cour" and a "noblesse de campagne," when the state has developed, is such a general feature of the corn civilization of Europe, and as a feature of the upheavals of 1914-18 has been the assertion of the peasants' hold on the land in several parts of East Central Europe, probably not including the greater part of Poland, the facts about France are of great value. And here they are presented with as little admixture of politics as possible and with multitudinous references to the Cahiers de Doléances and other valuable sources of information. It is a little book that cannot but interest the geographer who meditates on forms of society in relation to environment and occupation, and it is also a welcome change from the tiresome and ineffectual round of political discussion about the French Revolution.

The Royal Insurance Company asks us to inform our members that it will be pleased to supply any who are interested in golf with a copy of the revised "Rules of Golf." Applications should be made at the Company's Offices: North John Street, Liverpool; Lombard Street, London, etc.

THE League of Nations Union invites applications from teachers wishing to join a Summer School in Belgium, August 6tn—13th. Letters should be sent to 15, Grosvenor Crescent, S.W.1, with a deposit of £1 towards the fee of £9, which covers fares, pension, excursions, and classes.

From Messrs. Methuen's List.

A SKETCH-MAP GEOGRAPHY. By E. G. R. TAYLOR, B.Sc., Joint Author of "Essentials of World Geography." With a full Index. Fcap. 4to. **5s.** (Just published).

A text-book of geography on a new plan, by an experienced teacher and examiner. The sketch maps, of which there are 160 all completely up-to-date, are the basis of the book, and facing each of them is a page of notes. The whole field of World and Regional Geography is covered, and the book is specially suitable for the London Matriculation and similar examinations.

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THE
GEOGRAPHICAL TEACHER.

AUTUMN, 1921

Editorial.

IT is with great pleasure that we inform the members of the Association of the acceptance by the Right Hon. Lord Robert Cecil, P.C., K.C., M.P., of the Presidency of the Association for 1922, and by the Very Rev. Principal Sir George Adam Smith, M.A., LL.D., F.B.A., of the Presidency for 1923. The Annual Meetings for 1922 are to be held on January 5th and 6th at the Birkbeck College, Breams Buildings, Fetter Lane, E.C.4, and in mentioning this change of place we wish to express the gratitude of the Association to the authorities of the Day Training College, Southampton Row, for their kindness to us during several years, for their continued provision of a room for the Association's meetings, and for their kind efforts to make arrangements for us in spite of difficulties which proved too great.

MEMBERS of the Association will unfeignedly congratulate Miss Fleming on her fine contributions to the British Association Meetings at Edinburgh this year. Her paper on "Geographical Aspects of Tradition" was warmly welcomed by Dr. Newbigin and Dr. Blaikie, and has appeared in the Scottish Geog. Magazine for October. Particular attention is requested for the notice of Miss Fleming's book, "Geographical Aspects of Tradition," expanding the above paper and supplied at specially low rates to members.

MAY we appeal more strongly than ever for the prompt payment of the annual subscriptions for 1922. Heavy costs for printing on the one hand and the so-called Economy Stunt on the other, make it difficult to manage the Association and its magazine, and prompt payment of subscriptions is one of the best forms of help, as it liberates energy at the Central Office for the more important aspects of the Association's campaign. The members who pay up in and especially before January are thanked for their thought in easing our work, and it may be added that the collection of subscriptions sent late involves us in an expense of many pounds per annum. We appeal to all members to make this expense unnecessary, and especially we would ask any member who does not wish to continue his membership in 1922 to be good enough to let us have even a postcard before the end of the year intimating his intention of resignation.

MEMBERS are asked to report at once any case of surcharging of letters or packages from the Association by the Post Office. Cases have come under our notice, and the mistake has been traced quite clearly to certain post offices. It is often possible to clear up these points if notified to us without delay, and to get refund of expenses, but delays put this possibility out of the question.

A TRAINING College Lecturer complained in the "Teacher" recently about the type of question set in the Examinations of the Board. We pursued the matter both by independent enquiry and by correspondence with others, and felt that the correspondent who raised the matter had not quite got the proper perspective. We must see that people can put names in the right places on maps, and the naming of islands off the north and west coasts of Scotland and Ireland was only one section out of five in a question arising from an advanced course of two years' duration on the British Isles. At the same time, we agree with our correspondent that all examination papers need careful scrutiny and that there must be really adequate recognition of thought as well as of memorising work. Let us nevertheless remember the latter.

THE address which our ex-President and most valued colleague, Professor Grenville A. J. Cole, F.R.S., recently gave to the Irish Geographical Association, and which was entitled "The Clearing," is being published in extenso in the October number of the Journal of Education and School World. We are not only delighted to have this result of Professor Cole's matured wisdom, but also to know that he has recovered a sufficient measure of health to allow him to resume his valuable work for education and understanding in Ireland. His life and work furnish an inspiring example of lofty courage and steadfast idealism, of which his fellow geographers are exceedingly proud.

THE Syndicate controlling Cambridge Local Examinations showed its interest in the geographical movement some time ago by revising its syllabus for geography in the first public examination. It has now taken an important further step in giving permission for alternative syllabuses for use of candidates in Asia, Africa, and the West Indies (including British Guiana). As this examination is utilised far and wide, this new arrangement is of great value, and we thank the Syndicate most heartily for it, expressing at the same time our appreciation of the share in this welcome result of some of our members. We hope the Syndicate will crown this work by thoroughly overhauling the arrangements for geography in the Higher Certificate Examination.

WE are asked to publish to our readers the fact that a member of the Association has the first thirty parts of the Times Atlas for sale. Will anyone who might purchase them please communicate with Miss M. E. Lancashire at 4, Anerley Road, Westcliff-on-Sea, Essex.

AN important library which keeps a series of the "Geographical Teacher" is short of Volume X. (Ten), Part I., Spring, 1919, and offers four shillings for a copy. Will any member who has one for sale please send word to the Association's Office, 1, Marine Terrace, Aberystwyth?

THE Teachers' Registration Council, 47, Bedford Square, London, W.C.1, asks us to urge upon all teachers that they should register without delay. There is little doubt that, in the near future, the conditions and fees for registration will be made more stringent, and that the title "Registered Teacher" will become of direct value.

THE Secondary School Teachers' War Relief Fund has sent us an account of its valuable work, and the Association, as a body of teachers, owes its thanks to Mr G. D. Dunkerley, who has acted as secretary, for this effort, and to Mr L. Brooks, who was our Association's representative on this Committee. Three hundred and thirty-two deaths have been notified, and investigations have been made as to consequent distress. About 40 cases have received emergency grants, and about 60 are getting regular grants. £9,874 has been collected ; interest on capital amounts to £1,019 ; grants already made are £2,372 ; printing and postages have totalled £199. There remains a capital sum of £8,326 to safeguard present allowances, and this leaves a small margin for additional help. Contributions or legacies to this most worthy object will be gratefully received, and should be sent to the Hon. Treasurer of the Fund, Mr J. Hart Smith, c/o Barclay's Bank, 835, Wandsworth Road, London, S.W.8. Cheques should be made payable to the Fund.

IF sometimes the battle for geography seems a little dreary and unnecessarily prolonged, it is good to hear a triumph song from Southampton. We are glad to congratulate the University College there on its decision to utilise its unique opportunities for the development of geographical study, and to begin at the right end by the creation of a chair of Geography and the election thereto of Professor W. H. Barker, for whom all members of the Association will predict a successful career under his new title. In addition to the University courses, Professor Barker has organised a "Wessex Diploma in Geography" and a Diploma in the Teaching of Geography. The work of Professor Barker's department is much strengthened by the co-operation of the staff of the Ordnance Survey as Honorary Lecturers, and not content with this brilliant list, Professor Barker also draws help from Colonel Dudley Mills, the well-known specialist on the history of maps, and from several other people of standing and experience.

WE welcome two new affiliated Associations to our company, namely, an Egyptian Association under the charge of H. K. Selim, Esq., 29, Sheikh Hamza Street, Cairo, Egypt, and an Association for Agra and Oudh under Munshi Agarwala Lal, Esq., Lecturer, Training College, Agra, India.

ALL members of the Association and libraries taking the "Geographical Teacher" are asked to note that there have unfortunately been two printer's errors which need to be noticed in connection with the binding of the volume.

Volume XI., Part 1, was unfortunately wrongly called Vol. XII., Part 1.

The paging of Volume XI., Part 2, was unfortunately numbered from page 1 onwards, whereas it should be numbered from page 57 onwards to page 130.

Members are requested to make the requisite correction of the paging in Volume XI., Part 2, at once. Part 3, it will be noticed, assumes that this correction has been made and begins with Page 131.

The index of Volume XI. will be compiled on the supposition that this correction has been made by readers.

IT is proposed by members of the Snowdon and Chamonix Summer Schools to tour the Western Mediterranean in 1922, visiting Lisbon, Gibraltar, Algiers, Tunis, Sicily, Naples, and Corsica, and to devote some time to the study of volcanoes (Etna, Vesuvius, Stromboli). The tour will probably occupy a month. It is proposed to charter a large private ocean-going steam yacht. Readers interested are invited to write, discussing the proposal and offering suggestions, to Mr H. Valentine Davis, "Noddfa," Wistaston, Crewe, enclosing a stamped envelope for further particulars of the combined suggestions.

THE special sympathetic attention of all readers of this magazine is drawn to the letter on the Russian Famine, which could be so greatly alleviated were the world's conscience to wake up to an immense opportunity of bringing back peace and good-will. The plea of that great geographer, Fridtjof Nansen, for help for starving peasants and a fresh beginning of reason and human sympathy, after the ugly storm of temper and vice of the last few years, is one of the finest efforts towards the object that geographers have most at heart, namely, the eradication of the narrow prejudices which hitherto have so obscured the truth in our studies of other peoples.

MEMBERS of the Association will be very sorry to hear of the illness of Mr Fairgrieve, for so long one of the pillars of the Association, and known so widely for his single-minded devotion to the work of geographical education and his keen endeavour for the progress of philosophic geographical thought. This paragraph was at first intended as a message of congratulation to him on his most successful visit to America, but while there he fell ill and is temporarily away from duty. We wish him a speedy and complete recovery.

PROF. ROXBY has gone to China as British representative on a Commission of Missionary Societies to advise the Chinese Government and the Educational Committees on the organisation of the schools and colleges hitherto maintained by Missionary Societies. This is a great opportunity which worthily recognises Prof. Roxby's services to China. Readers of this magazine will feel the appropriateness of this compliment very specially, as they have so recently enjoyed his articles on the Far East, and may now look forward to more from his pen by and by on this subject. Prof. Roxby is expected to return during the summer of 1922.

THE Association sends its good wishes to the Société de Géographie of Belgrade and thanks that Society for the Bulletin it has received. It will interest our readers to know that different articles are in different scripts, some in Roman script and some in Cyrillic.

WE have received from the Clarendon Press a number of copies of Mons. Schrader's first Herbertson Memorial Lecture to this Association, and these are therefore now on sale from the Central Office at 2s. 6d., post free. Members who have not yet secured this thoughtful and prophetic statement of "The Foundations of Geography in the XXth Century" should take the earliest opportunity of doing so.

WILL members please note that the School of Geography at Oxford, and with it the Library of the Association, is now in Mansfield Road. All enquiries concerning the Library should therefore be sent to the School of Geography, Mansfield Road, Oxford. We hope the charge of premises will give Mr Beckit enhanced opportunities.

MR. PEAKE will very shortly be able to supply to students who may need it a chronological chart of the cultural periods since the Würm Ice Age, based upon the famous researches of de Geer, de Mortillet, Breuil, and others. Mr Peake, working in collaboration with a few friends, has been able to refine questions of dating, and thus to give students a sound basis for time-reckoning. Fidelograph copies of the chart will be supplied for 2s. 2d., post free, on application to the Clerk, but early application is essential, as only a small issue will be made.

TO **Canadian Geographers.** Mr H. M. Leppard, Normal Model School, Ottawa, Canada, wants to form a branch in his region, and will be glad to hear from anyone interested. The branch already formed in Montreal under Miss M. V. Couser, 398, West Hill Avenue, has a most interesting programme.

SPECIAL NOTICE.

AN important Committee of the British Association has been appointed "to formulate suggestions for a syllabus for the teaching of Geography both to Matriculation Standard and in Advanced Courses ; to report upon the present position of the geographical training of teachers, and to make recommendations thereon ; and to report, as occasion arises, to Council upon the practical working of Regulations issued by the Board of Education affecting the position of Geography in Training Colleges and Secondary Schools."

Members of the Association will be well serving the cause of geography if they will communicate with the Secretary, Prof. W. H. Barker, University College, Southampton, furnishing particulars from their own colleges, schools, and districts, bearing upon the above terms of reference. Conditions favourable to geography should be communicated no less than those that are unfavourable.

Will any member of the Association who wishes to take part in a possible French tour starting about March 22nd, 1922, lasting nearly three weeks, and probably costing about £30 to £35 per head, please inform the Hon. Sec., enclosing stamped, addressed envelope. The project is still uncertain for many reasons, including the dating of the Spring Meetings of the Association. The letters received will be treated in order of application, but no answer will be sent at present.

The Treaty Settlement of Europe. Geographic and Ethnographic Aspects. H. J. FLEURE. Oxford Press, 2/6.

Dr. Bowman's lavishly illustrated compendium of information about the world after the war stands out in contrast to the severe poverty of paper and printing which characterises the little English book produced under conditions of European post-war poverty. It will be of great interest to British readers to follow Dr. Bowman's point of view, and we may be grateful that the chief American work has been issued by so broad-minded a student. He treats the problem frankly from the standpoint of the political unit, the state, attempting to give us facts as to its linguistic and other elements, its problems and its prospects. He adds valuable summaries of many of the recent treaties. Its 215 maps, including a large number giving details of new boundaries, will be found invaluable, whereas the maps in the English book have been so reduced that they are in some cases little more than suggestions to students of maps they might draw for their own studies. Dr. Bowman's study of Russia will be found essential for any teacher who has to deal with this tragic problem. It is probably a characteristic difference between the two sides of the Atlantic that in the English work there are ever-recurrent criticisms of the nation-state as an institution, and the attempt is made to suggest, inevitably only in the barest outline, the thread of evolution of European civilization down to its modern and most precarious budding forth in industrial states, the rivalries of which worked to bring about the world war. Dr. Bowman's book covers the whole world, and touches incidentally the inter-state problems of Latin America and other regions not actually engaged as belligerents in the recent war. We hope that the opportunities which the American Geographic Society has of collecting information will be utilised for publication from time to time in the Geographic Review of details concerning further settlements and decisions which are continually altering the facts of our at present so unsettled world.

North England. An Economic Geography. BY LL. RODWELL JONES. 256 pp., 4¾in. x 7¼in. 6/-. Routledge. 21 maps and diagrams.

This study deals with the physical environments which have influenced the evolution of the great industries of North England, but deals with them so broadly and yet at the same time with such a thorough analysis of every local factor, that it is a model of the possibilities of educational geographic treatment of economic problems. The chief studies are:—The Tees district, the Cumberland and Furness iron district, the Derby and Nottingham and the Yorkshire coalfields, Hull and the Humber, North Staffordshire and the Potteries, Lancashire and the cotton and subsidiary industries. There are useful appendices on the localisation of industry and on variations in the sources of iron supply.

The Study and Teaching of International Relations.

By J. F. Unstead, M.A., D.Sc.

An Address given at the Annual Meetings of the Geographical Association, January, 1921.

WHATEVER may have been our views six years ago as to the importance of international relations or "foreign politics," the great war has brought home to us the important part which they play in the lives of all of us. Those who regarded "home politics" with greater interest saw these effaced for the time being by international affairs and transformed when again they claimed attention. One need only refer to the exacerbation of the Irish problem and the solution of the question of Woman Suffrage in illustration of this influence. Those who regarded social questions as important, saw these take on different forms and gain new significance. Those who had little communal consciousness, and whose "questions" related to their own well-being, found themselves caught up in a common whirlpool, and their fortunes determined by occurrences far beyond their horizon. Not only the belligerent nations were thus affected; the neutral peoples lived in the same upheaved world, and in some cases even suffered as much as some of the belligerents. It may be objected that the occurrences of the last few years are exceptional, that the war is over, and that we shall return to ordinary conditions. But I shall point out later that there are still international dangers that seriously threaten new wars, and that only by deliberate and wise arrangements can future wars be prevented. The conflicting interests of the inter-locked nations of the modern world must again result in warfare unless the peoples are educated to a higher degree of mutual understanding and good-will.

Moreover, the abnormal economic conditions caused by the past war have drawn attention to normal economic relationships, and everybody may now realise the inter-dependence of the nations in economic matters; the dislocation of productive industry in Central and Eastern Europe has too tragic an influence on unemployment and distress in Britain to be ignored. Again, the free passage (or, on the contrary, the restriction of free passage) of raw materials and manufactured goods across the world is seen to be a matter of the greatest moment to all countries forming part of the world of commerce.

The inter-dependence of modern nations has its influence not only on political and economic affairs; the spiritual conditions of mankind are as deeply involved as the material, for men necessarily have relationships of an ethical character. We must have dealings with other peoples and, unless we are entirely ignorant and absolutely blind, must therefore be either egoistic and selfish, or fair in our dealings, tolerant in our understanding, and well-wishing in our motives. Just as in physical geography, the unity of the oceans is a fundamental fact, so in human geography the unity of the nations is equally fundamental.

We are, indeed, "Citizens of the World," whether we realize it or not, and whether we like it or not; therefore, the question for us is: What kind of citizens are we to be? While for those of us who are teachers there is the further question: What kind of citizens are we to train?

It will be granted that if international relationships have the importance I suggest, they must be the object of definite study. Citizens should not remain ignorant of them, and teachers must, like other citizens, be instructed in these matters. Although, as a rule, it is the government, rather than individuals, which has to take action in international matters, yet the government in our own country does not normally and over long periods act contrary to public opinion. This public opinion may, however, be formed by certain "interests," financial, industrial, or military, or it may be formed by those who are not biassed by their personal advantage or pre-conceptions, but are able and willing to look fairly at both sides of a question, although the other side may be that of a distant people with whom we have little natural sympathy. Unfortunately, the "interests" are organised and powerful, using the press and the machinery of government; unbiassed and fair opinion has to fight great odds, and there is consequently the need to increase and strengthen it in every possible way.

Here one may welcome the establishment of the League of Nations, the organisation which may make effective this unbiassed and fair opinion. The League of Nations, is, however, merely machinery; its motive power must be the will of the peoples who are represented on its Council and Assembly. The future of a peaceful and prosperous world largely depends upon the League, and the future of the League depends upon the expressed opinion of the rank and file of the nations. The one hope, therefore, is for educated democracies and their realization of world citizenship.

How, then, may democracy be educated? What training in world citizenship is given? Picture to yourselves the average young man or woman who has left your schools; what training in the great problems of the modern world does he or she receive after the school years are passed? The treatment of these problems in the newspapers is usually deficient in matter and sometimes positively malicious in tone. Moreover, a part of the Press is undoubtedly, if not admittedly, in the hands of people who have axes to grind; these may be the industrial, financial, or military "interests," they may be the politicians who wish to gain or retain power. Moreover, even in an honest and well-meaning paper, there is, as a rule, a lack of *organised* knowledge; there are scraps of information and arguments on particular points of topical interest; these do not give a broad outlook over a great and complicated group of problems. There are, however, books of very great value, but it is the man already trained who normally reads and appreciates them. As for the conversations on international affairs, as one hears them in trains and trams, one can only regard them as affording instances of the blind leading the blind.

The Churches do, indeed, inculcate ideals of thought and conduct, but the application of these ideals to politics is usually, possibly rightly, left to the imagination, while it is clearly beyond the province of religious organisations, as such, to give instruction upon facts of economic and political relationships.

This instruction, so inadequately provided after school life, may, however, form part of the education in schools, and, for those who continue their studies later, in universities. In the schools, more than in any other way, can the training of citizens take place. The curriculum may deal with it under the heads "Civics," "History," or "Geography"; no absolute demarcation between these branches of education can be made, and no comparison between their values need be instituted. Suffice it to point out that while History deals with the past, and, therefore, with one set of facts which affect international questions, Geography deals with the present conditions with which these questions are concerned. Moreover, History affords a training by presenting examples of past problems which may present parallels with those of the present, and Geography must take into account the facts of the actual problems which now confront mankind. To the teacher of Geography, therefore, is offered a great opportunity, and upon him rests an equally great responsibility.

What, then, is necessary in a training for citizenship? Two things, in my opinion, are essential: a knowledge of facts and an attitude of mind. The knowledge required is that of the conditions under which various peoples live: the physical environment, the economic and political organisations, the social conditions, the ideas and ideals of the communities, so realised that the problems connected with them become real, and new facts introduced in connection with particular problems have a definite meaning and significance. This knowledge must be organised; its various elements must be bound together by causal relationships, as it is, indeed, in modern geographical study. In the second place, the attitude of mind must be that of goodwill to the peoples studied: neither hostility because they are "foreigners," nor contempt because their ways are unlike ours, but a desire to understand them, and a willingness to see their point of view, even when it leads to a course of action which may be strange or may conflict with the apparent interests of our own country. Perhaps the keynote to such teaching may be given in the phrase "*a sympathetic understanding.*"

If this is the kind of teaching necessary, what kind of a teacher is required to give it? Obviously, the teacher must himself have that knowledge and possess that attitude of mind, and, therefore, it would be entirely inadequate for him merely to study a text book and reproduce the matter for his pupils. Such dead instruction is worthless; the teaching must live, and the teacher must, therefore, be alive. He must himself be a citizen; he must himself have a real interest in international relations if he is to inspire interest. He cannot fit himself for his work by academic study alone; he must live in the world of to-day. One of the chief needs in the development of geographical teaching is for the teachers to go out from their schools, to go out into the market place and mix with the people there, to share the life of the world, and then go back into the schools in a critical spirit with the determination to over-haul their work, to throw aside what is not of service in training for life, and to introduce new matter and new methods which will fit the pupils for taking their part in the world outside the schools.

In the teaching of geography such a revision would result in the rejection of facts hitherto taught, and the inclusion of others which are necessary for an understanding of the great problems of to-day, and, indeed, those of to-morrow, for the geographer should be able to foresee some of the greater questions which will confront his pupils when they go into the world. Let me briefly state what I regard as the great problems of to-day and to-morrow with which the geographer is particularly concerned.

There are first the problems of Central and Eastern Europe. The war resulted in the break-up of great Empires and the liberation of subject peoples, but the populations of the new states are by no means homogeneous, and the problem of subject peoples has not disappeared. Although the numbers of people held against their will in an alien state are far less than they were, national consciousness has been awakened and the idea of political freedom is a greater force than it was before the war. National enmities have been aroused or embittered, and political conflicts are barely restrained. There are now, as part of the everyday life of Central Europe, conditions and occurrences such as seven years ago would have caused scare head-lines in the newspapers, if not military mobilisations all over the continent. And how a war may spread, once it has begun, we know only too well. On the economic side, Central and Eastern Europe are tottering on verge of destruction; what are the conditions of life for millions of people only those on relief expeditions to the stricken countries can realise, while on the spiritual side, the degradation and almost savagery in which millions of people have sunk is too terrible to imagine. To assure to these peoples political peace, economic re-organisation, and spiritual health must be the work of the whole civilised world, and a work of many years.

The second group of problems is that connected with the countries around the Pacific Ocean. On the Asiatic side are the Monsoon Lands, where the peoples have outgrown the natural resources, live normally little above subsistence level, are faced by starvation if harvests fail, and need outlets for the still increasing population. On the American side are lands only partially developed and occupied, and in the Australian region there are great territories almost unoccupied and natural resources almost untouched. To these relatively unused areas the Asiatic peoples desire to migrate, but the white inhabitants fear and dislike such an immigration; their standards of life, their type of civilisation, even their continued existence in the new lands seem to them to be endangered, and in one way or another they restrict or prevent the Asiatic immigration. Japan, the most powerful of the Asiatic states, bitterly resents this attitude, and international peace is seriously threatened. Balked at least for the time in this respect, she has made inroads upon Chinese territory, and is further extending her power over North-Eastern Asia. China, at present almost helpless, has, however, greater resources in man-power and coal-power than any other country, and should this great State, either by itself or under the guidance of others, be welded into a homogeneous and organised power, the Pacific problem would assume similarly gigantic proportions. Moreover, the "White Australia" policy cannot be supported by the power of Australia alone; the power of Britain must be behind it, and so the far-off Pacific problem is one with which the government of Britain is immediately concerned, little though this may be at present realised by the people of this country.

The third group of problems is that of the development of the tropical regions of the world. With the almost complete utilisation of temperate lands, these regions have assumed importance as the sources of raw materials for manufacture and of certain food stuffs, and this importance must inevitably increase. The tropical regions are also markets for manufactured goods, and so on both accounts they are coveted by the manufacturing and commercial interests of the industrialised states of Europe and North America. Hence there has resulted the scramble of the European nations for the possession of African lands and Pacific islands, only the Monroe doctrine of the United States holding them off from the New World. Thus international rivalries and clashes have occurred, and at the same time another and perhaps greater problem has arisen: the relations of these commercial peoples with the natives—the problem of the "backward" races. The story of the inter-action of white and dark peoples contains many discreditable and even tragic chapters, and the only hope of improvement depends upon the education of the social conscience of the dominant peoples.

The fourth group of problems is to be found within the British Empire. The past dominance of Britain must cease; the geographical conditions of the self-governing Dominions make inevitable, in the first place, their release from any form of dependence upon the mother-country, and, secondly, the rise of the larger of them to a position of greater importance than that of the small British Isles. Changes are now rapidly going on, and if these are to be free from friction, the peoples, especially of Britain, must realise the justice and inevitability of the developments. Perhaps more difficult will be the changes connected with India and the various African dependencies. The idea of self-determination has become a great force in India; the Montagu-Chelmsford scheme of dyarchy to facilitate the development of self-government in India is but one step in an advance which is bound to be full of difficulty, and needs both knowledge and good-will on the part of the peoples of this country as well as on the part of the peoples of India. Finally, the education of the natives of the African and other dependencies must be undertaken deliberately by the government and people of Britain: an education both political and economic to fit the more backward peoples to become in time self-governing citizens of the modern world.

Such, to my mind, are the great problems of to-day and to-morrow, and in connection with these problems one must note a new factor which has appeared in the world of men in the last year or two, a new organisation by means of which the nations of the world have agreed to co-operate to find, if possible, a solution to some at least of the difficulties. The League of Nations is charged, not only with settling disputes which may arise between States, but with removing causes of friction and arranging for common action in a number of spheres. It has considerable powers in dealing with the political and especially the economic difficulties of Central and Eastern Europe. The opportunities it affords for constant intercourse between representatives of the governments may help in reaching a settlement of the Pacific problem; moreover, this problem may be simplified by that levelling-up in economic status of the workers of the Monsoon Lands, which has already been begun through the International Labour Office of the League. The problems of the tropical regions cannot fail to be affected by the system of mandates held under the League, even though these only apply directly to restricted areas. Thus no study of the problems would be complete, which did not take into account the existence and activities of the League of Nations.*

It is suggested, therefore, that in the teaching of geography the fundamental facts underlying these problems should be included, and that the political relationships of the states and their co-operation in the League of Nations should find a place. But I am quite aware of the dangers involved in such teaching, and that care must be taken to avoid several pitfalls. Although the essential elements of the great problems must be given, there must be no introduction of politics. The teacher must be very alert to see that his own political opinions do not bias his teaching; he must strive to be perfectly fair in his presentation of the facts, to avoid the advocacy of particular policies, and, above all, to exclude any imputation of evil motives.

Another danger is that he may introduce these political and economic affairs at too early a stage. He can only do good work if his pupils are interested in the matters. But in the later part of a school course and in continuation schools, he may well seize opportunities offered either in the course of the geographical curriculum or by events recorded in the newspapers.

It is not suggested, however, that these matters should dominate the teaching of geography; they form only one part of it, for geograpical science is a whole whose value is lost if its unity is destroyed. The relations of nature to man and the inter-relations of human conditions must be looked at broadly, even when attention is specially given to particular aspects. But since, in my opinion, the most urgent need of the world is for educated democracies, and the hope of these lies mainly in the schools, the aspects of geography here considered are of such importance that both teachers and pupils should give them earnest attention. In no small measure the future of the world depends upon those educating the coming generation, and there is both a great opportunity and a great responsibility entrusted to the teachers of Geography.

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* Teachers will find the publications of the League of Nations Union of great value in keeping them in touch both with the activities of the League and with international relations in general. Conditions of membership and the receipt of publications may be obtained from the Secretary, League of Nations Union, 15, Grosvenor Crescent, London, S.W.1.

Correspondence.

Dear Sir,—May I put before the readers of "The Geographical Teacher" some considerations respecting the famine in Russia?

The basin of the Middle Volga is a "marginal" region, inasmuch as it is naturally a rather poor grassland bordering an arid region, and while cultivation is possible under normal conditions, in unfavourable circumstances harvests may fail. The rain is mainly in the summer, and on this rain the crops largely depend. The following figures show the average rainfall at Samara during the critical months of early summer, in contrast with the actual rainfall of this year. Because there was so little rain, the clear skies allowed unusual heating and evaporation, as the corresponding temperature statistics indicate.

	Rain in millimetres.			Temperature—Deg. Cent.		
	April.	May.	June.	April.	May.	June.
Average 1903-20 ...	27.0	38.8	46.9	6.4	16.2	23.7
In 1921	1.7	0.3	5.1	12.4	24.7	31.1

The result can easily be imagined, yet one has to add other considerations, particularly certain human factors. The general paralysis of production and transport resulting from the war has affected this region, and, moreover, the peasants have been pillaged by the various armies contending for power in Russia, while their opposition to requisitions by the Red Armies of the Bolsheviks brought slaughter to re-inforce poverty.

Here, then, is a population of scores of millions of people, the victims of both nature and man, dying of starvation, and appeals for help have gone out to the more favoured peoples of the world. The suffering is on such a scale that, for help to be at all adequate, it must come from both public and private sources, and yet the political quarrels of the States of Europe and the opposition between these and the Bolshevik Government may hinder the giving of the assistance which is due from us for the sake of humanity. Even from the League of Nations, expected help seems to fail, for the report just received from the meeting of the Assembly at Geneva states that the League, having no money, regrets that it can do nothing but wish well to relief organisations. Britain deplores a lack of funds, while other States refuse help to the peasants of the Samara region, who have suffered directly from the government at Moscow (500 miles away), as though they were responsible for the doings of that government. As a matter of fact, help given to them will neither support nor embarras that government; the issue is in no way a political one, and the Soviet authorities have, indeed, given complete freedom to the operations of the several organisations which are helping the children of this region—children who were found eating grass and the bark of trees to keep themselves alive.

As assistance must be derived largely from private sources, may I appeal to my fellow-members of the Geographical Association to do what they can? We, better than most citizens, know the conditions, and if it is our duty as teachers of geography to give children "a sympathetic understanding of the lives of other peoples," can we withhold our own sympathy with these Russian people or deny it expression in actual help? If our geography claims to touch imagination, how can we fail to realise the need of these people by the Volga, even though they are on the other side of Europe? Possibly, in addition to giving direct help, some teachers may find themselves able to interest their pupils in helping these millions of Russian children.

There are several relief organisations doing excellent work, but their total funds are at present hopelessly inadequate, and for those who have not another address to which they send help, I would mention that subscriptions to the "Save the Children Fund," 26, Golden Square, London, W., will now be devoted to Russian needs.

I am, etc.,

J. F. Unstead.

Mr. Basil M. Bazley sends us a little guide book, "The Charm of England," which he has prepared for the London and North Western Railway. There are many excellent photos of some of the historic buildings we possess, and the letterpress is intended to interest American travellers. This seems a commendable enterprise on the part of a Railway Company, and we are glad to note that a student of geography has done the work.

Teachers interested in obtaining series of views of Grecian buildings and sculptures should write to M. Fred Boissonnas, 4, Quai de la Poste, Geneva. There are six volumes at 10 francs each dealing with Epirus, Salonica, Smyrna, Athens, ancient and modern, and Macedonia.

The Dravidians of South India: Their Distribution, History and Culture.

By C. K. Das, M.Sc., University of Liverpool.

THIS article tries to sketch the chief features of the culture and the homeland of the Dravidian peoples of South India. The term Dravidian as contrasted with ' Aryan ' is often used loosely and vaguely.

Who are the Dravidians? How do they differ from the peoples of the great Northern Plain? What forces have moulded their culture? Do they possess any outstanding characteristics which have always distinguished them? What contribution are they now making to the economic life of the world and to the general stock of civilization? What is their outlook on the political problems of India and the East? These are the questions which in the setting of the physical geography and space relations of South India, I shall endeavour very briefly to answer.

The term Dravidian now primarily denotes the South Indian peoples as a group which (1) speaks one or other of a series of closely related languages, differing radically from the Aryan languages of North India ; (2) through the community of these distinctive languages, embodies an ancient and voluminous literature and a vast mass of suggestive folklore, and, through achievements in developing an art of their own, has developed a certain " nationality " feeling and outlook.

Practically the whole of India to the South of the Vindhya Hills, except a part of the South Bombay Presidency, is at present the land of the Dravidians. Of this region the mountainous districts of the interior are inhabited by hill-tribes who, in the opinion of some ethnologists, are the prototypes of the Dravidians, while some find no such racial relation, though they have, to some extent, been influenced by Dravidian culture. The Dravidians proper occupy the whole of the Madras Presidency, including the native states of Travancore, Mysore and Hyderabad, with, especially on the W. and the N.E., small tracts of outlying territory.*

Confined from the earliest times to the regions south of the Vindhya Hills and the high Deccan plateau, the Dravidians were able to develop a culture of their own, establish kingdoms and maintain an extensive foreign trade. The Aryans in the North found it easier to extend their colonisation along the fertile and easily-acquired territories towards the east along the Gangetic plain than to send expeditions over the mountainous and forested barriers to conquer the South. This first intercourse between the two races was principally religious and commercial, with many mutual influences. The military expeditions were not undertaken until a much later date. In the latter the Aryans, or rather the particular group that settled in Rajputana and surrounding provinces, as represented by the Chalukyas, made victorious raids into the South, and established kingdoms that lasted for a few centuries. On the other hand, the Andhras (Telugus) and the Tamils made successful inroads on the N. and N.E.

Despite the contact of the North and South by these means, the physical barriers in Central India have left their mark on the population of those regions. The South has imbibed a considerable amount of the culture of the

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*See appended map.

North, and the North, in its turn, has been influenced by the South. But the people of the Central Indian plateaux have been little influenced by either, and they are still in a primitive state.[1]

The Dravidians may be divided into four main divisions according to the languages they speak, viz., [2]Tamil, Malayalam, Telugu, Kanarese. Tamil: This language is probably the earliest cultivated of the Dravidian languages. This is spoken, outside the area on the map, by the bulk of the coolies[3] in the tea, coffee, and rubber plantations of Ceylon, Assam, and the Malay peninsula. Many of the labourers in the sugar plantations of Mauritius, the West Indies, and British Guiana are Tamils. Most Indian labourers in the Transvaal and Natal are Tamils. " Wherever money is to be made, wherever a more apathetic or a more aristocratic people is waiting to be pushed aside, thither swarm the Tamilians, the Greeks or Scots of the East, the least superstitious and the most enterprising and persevering race of Hindus."[4]

Of all the Dravidian languages, Tamil has the most varied and the most extensive literature. The Tamils had cultivated the art of poetry to a very high degree of excellence. Among the earliest works which were without Sanscrit influence are some of the best poems on varying themes from pure grammar to epic, ethical, epigram, and devotional mystic poetry. The epics recount tales calculated to impress the glories of virtue. In its ethical and devotional poetry, Tamil stands supreme. No language in the world possesses [5]" a richer devotional literature or one more instinct with brilliance of imagination, fervour of feelng, and grace of expression." The influence of Sanscrit destroyed the originality and vigour of this ancient literature, but a revival of Tamil learning produced some first-rate poets, who, though they borrowed from Sanscrit epics and tales, made them so entirely their own and treated them according to the best traditions of the pure Tamil literature, that they successfully rival their Sanscrit originals. The most outstanding instance of this is the " Ramayana " of the Tamil poet Kamban, which, except for the outline of the story borrowed from the Sanscrit poet Valmiki, is entirely Tamil in spirit and treatment.

Malayalam is spoken along the Malabar coast from near Mangalore southwards to Trivandrum. This language may be considered an offshoot of Tamil, having grown out of it by absorbing a considerable amount of Sanscrit. In the earliest references to the regions of South India, Malayalam is not separately mentioned, but is included in the Tamil. Chera, one of the three ancient Tamil kingdoms, was later on divided into two, the portion lying to the west of the W. Ghats becoming the Malayalam country, and the inland district comprising Salem, Coimbatore, and a portion of Mysore. Its literature is modern and influenced by Sanscrit.

Telugu: " In respect of antiquity of culture and glossorial copiousness, Telugu is generally considered as ranking next to Tamil in the list of Dravidian idioms, whilst in point of euphonic sweetness it justly claims to occupy the first place."[6] Telugu is spoken along the coast from Pulicat northwards to Chicacole, a little to the north of Vizagapatam, and extends inland to the Maratha country and Mysore, including the Ceded districts, a considerable part of the Nizam's dominions, and a portion of the Nagpur country and Gondvana. The Telugu people form the most numerous branch of the Dravidian race. The people are called Andhra by Sanscrit writers. There are various references to the Telugus in the early writings: the Kalingas, important in commerce and war on the coast of the Bay of Bengal, were probably Telugus.

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[1] See in the Statistical Atlas of India the regions of Animism. A belt of country along the Central Plateaux stands out prominent.

[2] Population statistics (figures in millions);—Tamils, 20; Malayalis, 7; Kanarese, 10.5; Telugus, 23.

[3] ' Cooly ' derived from the Tamil word " cooly," meaning " daily wages."

[4] Caldwell: " Comparative Grammar of the Dravidian Languages."

[5] Barnett: " The Heart of India."

[6] Caldwell: " Comparative Grammar of the Dravidian Languages."

The Telugus have strong national feeling, and have been working ceaselessly towards creating an Andhra province. They wish to create an Andhra University with its centre at Rajmundry. We may see, possibly at an early date, a few universities in South India, distributed according to language, with perhaps a reformed premier university at Madras.

Kanarese is spoken throughout Mysore, in the Southern Maratha country, and in the western districts of the Nizam's dominions. It possesses classical and colloquial forms with the different inflexional terminations. Kanarese is the state language of Mysore, and Mysore University is really a Kanarese University. Kanarese possesses some ancient literature and a vast store of folklore.

The direct evidence for ancient Tamil ascendancy in trade is most abundant, though their neighbours were also active. South India has traded in early times with the Phœnicians, Jews, Assyrians, Greeks, Egyptians, Romans, and, in modern times, with the Turks, Venetians, Portuguese, Dutch, and English. The assertion of Dr. Sayce that S. India exported teak to Babylon about 3000 B.C. is not accepted by all authorities. According to Kennedy, there is no archæological or literary evidence for maritime trade between India and Babylon prior to the seventh century B.C., but direct evidence is available for the sixth. The Indian cedar beam (teak) found in the palace of Nebuchadnezzar (604—502 B.C.) and two logs of wood apparently of teak in the temple of the Moongod at Ur rebuilt (555—538 B.C.), must have been taken from S. India. Certain Indian commodities, e.g., rice, peacocks, sandalwood, were known to the Greeks and others under their Tâmil names, in the fifth century B.C. [7]Rhys David's dates this seaborne trade from the eighth to the seventh centuries B.C. He also mentions that the mariners took advantage of the monsoons and traded between the ports on the S.W. coast of India and Babylon.

There are several references in the Bible to the trade with S. India, whence the princes and merchants of Palestine obtained spices, etc.[8] The most telling evidence for this trade with Palestine is preserved in the adaptation of purely Tamil words to denote commodities obtained from South India in the Hebrew Scriptures.[9]

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[7] Mukerjee: "Indian Shipping." A very useful book giving very detailed evidences of the maritime activities of India from the very early times. Much of the information relating to shipping given in this paper is taken from this book.

[8] Solomon (1015 B.C.) obtained spices, peacocks, etc., from Ophir (1 Kings ix., 26, 27, 28). Ophir is identified with Ovary, a village near Tinnevelly. When Ezekiel talks of the commerce of Tyre (Ezek. xxvii., 24) he refers to commodities of Indian origin.

[9] Peacock—tuki (Hebrew); tokei (Tamil). Fragrant wood—ahalim or ahaloth (Hebrew); aghil (Tamil) is the aloes in the Proverbs vii., 17.

In Ctesias' "Indica," the earliest Greek treatise on India, mention is made of "Karpion" (meaning cinnamon), which is directly derived from the Tamil word "Karuppa" or "Karuppu."[10]

Numismatic evidences point unmistakably to the growth somewhat later of an active Indian commerce with the west, chiefly Rome. The large find of Roman coins in the Tamil country is evidence, and we note the device of a two-masted ship on some Andhra coins. The Indian trade with Rome flourished in the period from Augustus to Nero. Pliny laments "the wasteful extravagance of the richer classes and their reckless expenditure on perfumes, unguents and personal ornaments," declaring that there was "no year in which India did not drain the Roman Empire of a hundred million sesterces."[11]

Even in the seventh century B.C. the S. Indian mariners were aided by the monsoons, but the discovery of their regularity is said to have been made in 47 A.D. by a pilot named Hippalus; and from that time ships sailed in their season direct to the Malabar ports.

The Western merchants brought with them wine, brass, lead and glass for sale, and in return took pepper, ivory, pearls, beryls and fine muslins. The Indian articles were obviously of more value, for a large amount of Roman specie was brought into India, in addition to the wares of Europe. The latter were necessaries of life, and exchanged for the luxuries produced by India or imported by her from China and the East. Silk was obtained from China, spices from India, pearls from the sea skirting the South coast, beryl from Padiyur in the Coimbatore district and from Vaniyambadi in the Salem district. The beryl obtained from these mines was the best in the world. Roman coins are found in numbers near these mines.

After Nero the Romans returned to a life of moderation, and the few Roman coins of later date are in cotton districts, the mines being practically deserted. In 408 A.D. Rome's ransom paid to Alaric included 3,000 pounds of pepper. There were colonies of 'Yavanas' (Romans, Greeks, etc.), who were either warriors in the service of the Tamil kings or merchants. Reference is made to "the importation of Yavana ware, lamps and vases, and Nilgiri megalithic tombs have numerous bronze vessels of the early centuries of the European Christian era."

Of the literary evidences for the sea-borne trade with Europe there are two kinds, viz., mention in foreign works and in Tamil books. The 'Periplus of the Erythrean Sea' (100 A.D.) and Ptolemy's Geography (140 A.D.) are the chief reliable foreign books. The 'Periplus' is a kind of marine handbook, written apparently by a mariner who had sailed the Red Sea, the Arabian Sea, and the Persian Gulf, and who lived for a long time in Barygaza-Bharoach, the principal distributing centre on the West Coast. He mentions the Indians trading with their own vessels, some of them large. They sailed to East Africa for gold, to Arabia for gums and incense. There were Hindu settlements on the north coast of Socotra.

Ptolemy's Geography describes the whole of the coast from the mouths of the Indus to those of the Ganges. He has accurate details of the places on the W. and S.E. coast, but is less reliable on the Ganges region. Tamil works give picturesque details of trade in South India in early centuries of the Christian era. [12]Kaviripaddinam was built " on the northern bank of the Kaveri River, then a broad and deep stream, into which heavily laden ships entered from the sea without slacking sail. The town was divided into two parts, one of which, Maruvurpakkam, adjoined the sea-coast. Near the beach were raised platforms and ' godowns ' or warehouses, where goods landed were stored and stamped with the Tiger, the emblem of the Chola (Tamil) Kings, after payment of customs duty. They were then passed on to merchants' warehouses. Close bv were the settlements of the Yavana merchants. There were then rows of shops where the vendors of spices predominated. Artisans of all kinds had their habitation there.

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[10] Caldwell: "Comparative Grammar of the Dravidian Languages." A great number of other Tamil words that have found their way into European literature are given in this book.

V. A. Smith: "Early Hist. India"; Corundum from Salem and Coimbatore is a Tamil name (Kurrandum).

[11] Mukerjee: "Indian Shipping."

" Horses were brought from distant lands beyond the seas ; pepper was brought in ships ; gold and precious stones came from the northern mountains ; sandal and aghil came from the mountains towards the west ; pearls from the southern seas, and coral from the eastern seas."

It is worth while noting that in these Chola parts there were lighthouses built of brick and mortar which exhibited blazing lights at night to guide ships to port. The first two centuries of the Christian era found the Chola ports carrying on active commerce with Bengal and the isles of the Malay Archipelago. Lower Burma was conquered by emigrants from the Telugu kingdoms.[13]

The Tamil states maintained powerful fleets, and the rulers took a personal interest in the welfare of the trade. With the fall of the Tamil kingdoms about the thirteenth century A.D., the Dravidian trade declined because the conquerors cared little for either inland trade or sea-borne commerce. The fleets dwindled ; the harbours were left desolate and were gradually submerged by the sea, and are at present marked by vast mounds of sand, with perhaps a lonely village at the site.

From early times Dravidians, and especially Tamils, have founded colonies. The earliest was the Tamil colony of Jaffna in the north of Ceylon. The Tamils settled there about 204 B.C.[14] There were Tamil kings in Jaffna until 1617 A.D., when the Portuguese took possession of the place. There has long been the closest connection between the Jaffna Tamils and their kinsman on the mainland. This conservation of Tamil tradition characterises the Tamil people wherever they go. The greatest effort was the colonisation of Java. The earliest Indian peoples to reach the island were the Klings, the people of Kalinga.[15] The Andhra country, i.e., the land of the Telugus, was called Kalinga. It is almost certain that the Klings that went over to Java were Dravidians, probably belonging to the Telugu branch. This, according to tradition, was about the year 78 A.D.[16]

About the 7th century A.D. there were political disturbances in India consequent upon the ' Hun ' invasions and the consolidation of the Empires by Harshavardhana in the north and by Pulikesin II Chalukya in the Deccan. As a result of the chaotic state of the country and the insecurity of life, it is believed, a numerous body of colonists emigrated from the districts around Gujerat to the islands of Malay Archipelago. One branch of these colonists is said to have arrived in Java. If they did, they did not leave any lasting impress on the island. On the other hand, we see from archæological evidence and Javanese art that the influence of the Dravidians on Javanese culture has been marked and permanent. Recent investigations[17] have conclusively proved that the architecture of Borobudur (7th and 8th centuries, A.D.) is entirely Dravidian. J. W. Ijzerman, a Dutch engineer, contends that Fergusson was misled by inaccurate drawings. The Javanese temples, with the solitary exception of Chandi-Bima in the Dyeng, are Dravidian[18] and not Chalukyan. Vincent Smith[19] holds that the character of the sculpture and the details of ornamentation in the later caves of W. India (Chalukyan) do not appear to be " so nearly identical with what is found in the Javan monument " as Fergusson affirms. The difference rather than the resemblance impresses the mind. The Indian sculptures which most nearly resemble the Javanese work are those executed under Chola (Tamil) patronage in the 11th century.

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[12] The chief account of the trade of the Tamils with foreigners is given in " The Tamils 1800 Years Ago " by Kanakhasabhai Pillay. Very copious extracts from the work are quoted by Mukerjee : " Indian Shipping."

[13] For this reason the people of Pegu, i.e., Lower Burma, have long been known to the Burmese and to all foreigners by the name of Talaing.

[14] Encyclopædia Brittanica, 11th Edit. Art. ' Jaffna.'

[15] Modern Orissa and a few districts to the South. The territory occupied by the Telugus in the hey-day of their power, when they came as far south as Madras, was also known as Kalinga.

[16] Campbell : " Java ; Past and Present."

The Dravidian system of enclosure within enclosure with pillared corridors was also carried to Siam and Cambodia, where the largest and most magnificently sculptured temples were executed in the Dravidian style. The later influence of Brahmanism on Java has led many to believe that the Javan civilization was the result of Aryan influence. This is, however, disproved by the fact that even Sanscritised names of places in Java have been derived from the Dravidianised forms of Sanscrit names. Thus the ' Aryan ' or Sanscrit influence in Java came immediately from South not North India. It is all the more certain, therefore, that even the Brahmanic element in Java was introduced mainly through the agency of the Dravidians.

Burnell[20] holds that the Kawi (Javan) alphabet has descended from the Vengi (Telugu) and Pallava (Tamil) alphabets, and regards Pallava as the original of the Javan script. Dravidian words that occur in Kawi and Javanese are apparently all Tamil.

The Dravidians are still great colonisers. They are an enterprising race, and do not hesitate to look for work in foreign countries, provided they are paid decent living wages and allowed to keep to their customs and live their own mode of life. In the development of the tropics, particularly where there is need for agricultural employment, they play a great part, and their rôle will be still more needed in the near future. It is to be regretted, however, that the treatment to which these peace-loving people are subject in many instances has discouraged many from emigrating. The conditions of the Indian labourer that obtain in colonies like S. Africa cannot be too harshly commented upon. This, together with the unquenchable desire of the Indians to find their last rest in their own country, induces many of the labourers to return home after their period of work has expired.

The S. Indian peoples are skilful agricultural labourers, and carry all before them in that line. The colonist competes with the indigenous workmen and easily beats them. This is only natural, for in his own country he has to struggle to wrest food from a not too fertile land, to support an over-crowded, half-starving population. Having been trained in such a stern school, he finds it easy to hold his own against the labour of indigenous tribes who are blessed by a more bountiful nature. Unfortunately, when the Dravidian colonist saves money and sets up a small business, the very men that so eagerly took him to work grow jealous, though his influence is acknowledged to be good by all experts.[21]

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[17] Fergusson: " History of Architecture," Vol. 3.

[18] Enc Britt. Art. " Java."

[19] V. A. Smith: " History of Fine Art in India and Ceylon."

[20] A. C. Burnell: " South Indian Palæography."

[21] Report of the Committee on " Emigration from India to the Crown Colonies and Protectorates." Cd. 5192.

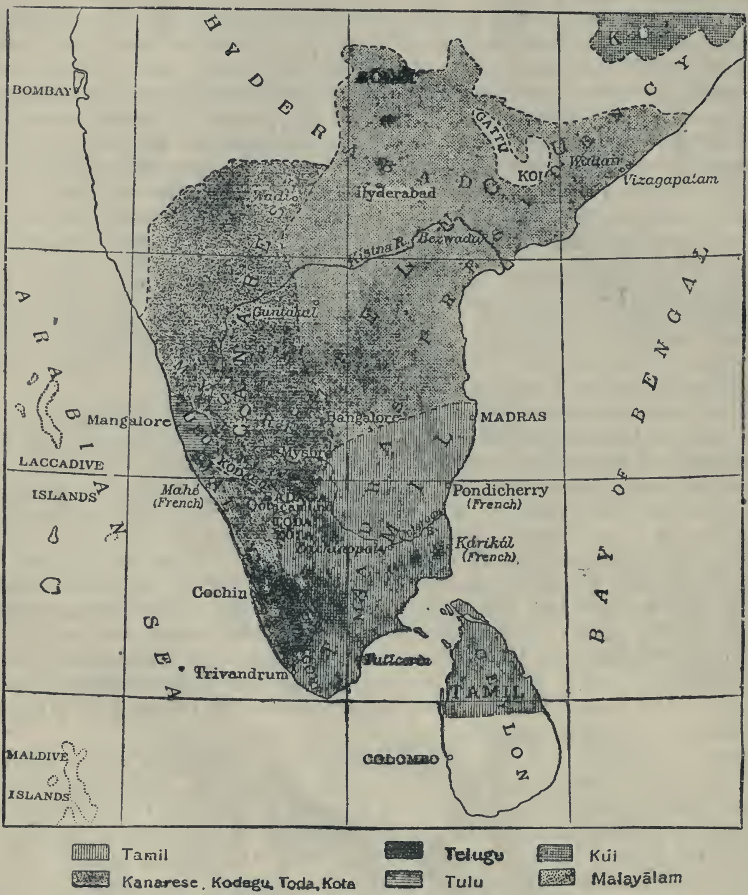

Fig. 43. Map showing distribution of the Dravidian languages.

From "Madras," by Edgar Thurston; Block kindly presented by the Cambridge University Press.

A Graded Course of Geography. By E. S. Price. Book I.

64 pp., 7¼in. x 9¾in. 2/-. Philip.

This Book I. is intended to cover the first year's work of a four years' course in the secondary school, and during this year Mr Price concentrates on the inculcation of very definite ideas regarding globes, maps, climate, and vegetation. The region which he has used for detailed study and in the application of principles learnt is South America, and the material is particularly well handled, as one would expect from such a successful teacher as Mr Price has proved to be. Some of the distinguishing features of the book are the great prominence given to individual work, possibly even with a large class, and the excellent treatment of reasonable and not forced correlations with other subjects. The book is safe, is carefully written, abounds in useful statistical and other exercises, and is well illustrated by clearly drawn maps and diagrams, which can be copied with advantage by the pupils. All parts of the book are good, but chapters V. and VI. dealing with elementary mathematical geography call for special praise.

R.M.F.

Weather Records in the Concrete.

BY V. C. SPARY.

CONTINUOUS weather records, kept by children in rotation, sooner or later are spoiled by dirt, errors, blots, etc. The final graphic record is rarely a thing of beauty. With young children these errors are more frequent, and the results tend to weaken the enthusiasm of the observers.

Accordingly attempts have been made to record weather observations in other ways, and the two pieces of apparatus described below were evolved. They have already proved their usefulness, and the pupils have shown increased interest in this part of their work. The children have also made a valuable addition to the geography ' stock ' for use in higher forms.

A WIND ROSE.

A piece of wood about 10in. square and ¼in. thick was stained a dark colour to hide finger marks. Four saw cuts, intersecting in the centre of the board, were made to represent the eight chief points of the compass. These cuts were not more than ⅛in. thick. A length of wood was made about ⅛in. broad, and thick enough to fit into the saw cuts.

Having marked each cut with its appropriate direction the wind rose, was ready for use. Each observation decided :—

(1) From which of the eight directions the wind was blowing.
(2) The strength of the wind according to a scale already decided on by the class.
(3) Whether the day could be classed as fine, rainy, or neither.

The pupil taking the observation would cut with a knife from the length of wood a strip according to the force of the wind. If he decided the day was fine, the strip would be dipped in red ink, if rainy in black ink, if neither it remained its natural colour.

The strip was then stuck into its proper slot. With occasional supervision a very pleasing result was obtained. When completed, this piece of apparatus helped a great deal to decide whether our winds came more from one direction than another, whether one direction of wind gave more wet days than another, and whether strong winds have much to do with the amount of sunshine or the direction of the wind. From records of the last ten months our abnormal weather was at once apparent.

THE PATH OF THE SUN.

Among the many observations of the sun that can be taken is that of its altitude at certain intervals of time on any given day. The altitude can be measured in different ways, and where pupils are becoming acquainted with the geometrical considerations of angles, it has been found of value to use a home-made anglemeter to record these altitudes. Such an instrument is depicted in Fig. II. When the shadows of the pointers are coincident, the long bar records the altitude in degrees.

Accordingly, on a sunny day, altitudes were recorded every 45 minutes. These observations were plotted on squared paper, and by plotting the time of sunrise and sunset, a ' sun curve ' for the day was obtained. A similar set of observations was taken a month later, and records for over a year were compared and discussed.

This very valuable set of records suffers from the defect that the graph is not a true representation of the position of the sun at various times, the important rotating movement of the earth being omitted.

The defect can be corrected by constructing from the curves a simple model. Mark a circle on a piece of cardboard or wood. This circle is to represent the horizon, and it must be oriented. Erect thin rods due E., S., W. and N., and at convenient distances between, and against each rod mark the time, E. being 6 a.m. and W. being 6 p.m.

The curve for the month is then cut out in paper, bent round the horizon circle, and a mark is made against each rod that it touches. Holes, or slots, must then be made in the rods where the marks come, and a thread or wire passed through the holes, and, lastly, into the board at the positions of sunrise and sunset. The curve for each month is transferred in this way to the model, Fig. III.

(NOTE.—The horizontal scale of the graph must, of course, be the same at the circumference of the horizon circle).

The advantages of this method of recording observations include the appeal to the child's constructive instinct, the accumulation of a year's observations in one model, and the record of the actual position of the sun with relation to man throughout the year. This last advantage will specially appeal to teachers in towns, where children rarely can see the sun rise and set, even if they are inclined to do so. In fact, the positions of the summer sunrise and sunset, as depicted on the model, so astonished one town dweller, that he determined to get up during his holidays and find out whether the model was reliable.

With a little extra care, a demonstration model can be made which can be used as a very valuable aid in teaching climates throughout the year.

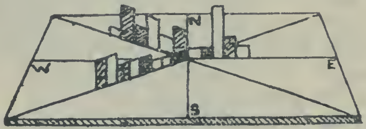

Fig 1 Wind rose partly filled in,

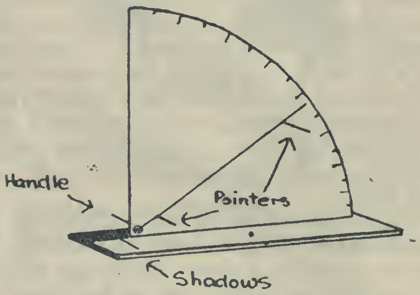

Fig 2. Anglemeter.

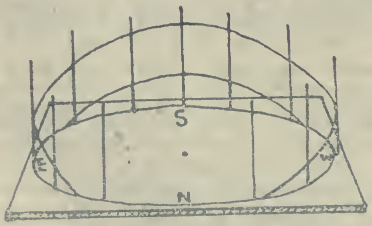

Fig 3. Apparent Path of Sun. Summer and Winter trace in position.

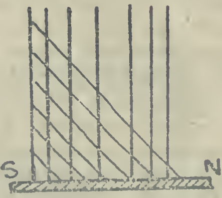

Fig 4. Side elevation showing records for six months.

The Dispersal of America's Natural Products.

THE student of mankind finds it convenient to make a broad distinction between lands in which man and environment have acted continuously each upon the other to produce a continuous development from the simplest beginnings to the present day, and lands in which the work of the native folk is overlain, as though there were a geological unconformity, by the new life introduced by immigrants arriving with highly developed experience from distant lands. Thus, while the Far East demonstrates a high degree of continuity from 2400 B.C. onwards, and the Mediterranean, in spite of oscillations and irruptions, a measure of such continuity, pre-Columbian and post-Columbian America differ deeply and the survivals of native life are very markedly distinct from the forms of life imported from Europe, even though in the Latin or Catholic lands a great deal of native blood may have become incorporated among the people living after the European fashion. In studying such a region, teachers of geography are too apt to think only of the contributions brought to America by the Europeans, and in this short article it seems worth while to suggest the study of the contributions made by the natives brought into touch with the wide world through the coming of the Europeans. To follow the indirect effects of these contributions over the old world would be to open up vistas of sociological research of the utmost interest.

Man in America found neither ox nor ass, sheep nor goat that he might domesticate, but only the difficult llamas of the sub-tropical southern Cordillera, not to be adapted far outside their home. As has been often pointed out, the bison with its swift movements over long distances did not permit man to master him, and the American Indian failed to acquire that habit of treasuring experience and handing it unchanged through the generations which so distinguishes the men of the Asiatic steppes. In those parts of America, however, in which there was a sufficiency and a predicable alternation of sun and rain, men did grade from hunting to cultivation, without the intermediate herding stage which, with a few exceptions, has been so characteristic in the Old World. The beginners in cultivation in America had a collection of plants to work upon different from those of the Old World, and wheat and rice, for instance, were not in use in America before Europeans came. Let us urge in passing that it is dangerous to argue thence the isolation of the American Indians from the days before the adaptation of wheat and rice to man's needs. That would be to go too far, though there cannot well have been more than casual migrations around or across the Pacific since those crops were added to man's equipment, or surely they would have reached America. In this article the aim is not so much to give an exhaustive list of America's contributions to the world as to draw attention to some which have exercised a considerable influence on our social life.

First and foremost must be mentioned food plants which are now almost the index-plants of certain regions of the Old World, namely, the potato, the maize plant, and the cassava plant.

The potato is claimed as a native of South Chili and of Bolivia, and its leading characteristic is its tolerance of relatively heavy rainfall and its preference for moderation in temperature. These two features make it a valued food-source in many regions in which the ripening of wheat is uncertain. It is thus a support for populations living in rather poor circumstances, and as such it has notably helped the Irish peasantry in the past, while the potato disease and famine of the " hungry forties " has been one factor, among several, of the reduction of Ireland's population. In regions where the potato does not grow well enough to be used for food, as in parts of East Central Europe, it is cultivated for distilling to give alcohol.

Maize is the traditional crop of the American cultivator, and America has remained the leading maize producer, in spite of the extensive spread of the crop into several parts of the Old World. The idea of free experiment in wheat cultivation was slow to spread, and maize was adopted largely in some parts which might have been used for wheat. But there was also the reason that the maize plant can grow in ground very roughly prepared, so it offers a crop, and a crop with very heavy returns, for rough tillage. It can be left out a long time to ensure ripeness, and so in this sense is less sensitive than wheat, though in climate it has by no means the range that wheat has been found to have of late. It is of strong growth and can furnish useful fodder in regions where the warmth is not sufficient to ripen the grain. Lyde has insisted on the great possibilities for maize in South Africa. In Europe it has spread large'y for animal fodder in Aquitaine and Burgundy, but it is used for food to a large extent as well in Roumania and Hungary, in which countries wheat was grown (pre 1914) largely for export.

The cassava plant has spread far and wide in the tropics of the Old World, partly because its cultivation demands very little work or risk. As it exhausts the soil quickly, the cultivator has to move at times, and at least will usually try to keep up hunting as a supplementary activity. It is therefore an influence that to some extent hinders the full evolution of the settled life among those who depend on it. The foodstuff is root substance ground up and called manioc in the tropics and, in rather different form, tapioca in commerce.

Though the banana was probably a native of South Asia, there has been discussion as to whether it had not in some way reached America before Columbus' time. The evidence on this point is not clear, but at any rate it is not necessary to consider the banana here.

Of the two forms of sugar cane, it seems that one was cultivated from remote times by the Chinese, introduced into Europe by the Saracens, and taken to America by the Spaniards ; the other is a native of tropical America, but this is not sufficient ground for considering the sugar cane in any degree as a gift of America. The sugar maple is, however, a valuable source of the product nowadays, and is American. Of other foods one may mention the tomato, the true pineapple (Ananas sativus), and the melon tree (Carica papaya), all of which are American.

The finding of mahogany in Central America deeply influenced the cabinet-making and ship-building industries, its fine hard wood permitting refinements of fitting, and thus helping the improvement of the ships of the 18th century. As England was then leading in maritime affairs, the mahogany industry had a great development in our country, and with that development are associated the famous names of Chippendale, Sheraton, and others, but there seem to have been hundreds of men making fine furniture in the intervals of shipbuilding in the scores of little British ports which were then busy with foregn trade and easily accessible to the relatively small vessels of that time.

Of other plants of industrial value one must mention that besides its well-known eastern origin, cotton is also indigenous in America. The western form is called Gossypium barbadense, and the name is a reminder of the immense importance of Barbadoes in the early days of cotton cultivation. Readers of " Westward Ho " will not need to be reminded of the special value to sailors in sailing ships of this salient of the West Indies, fronting the trade wind.

Caoutchouc comes from the South American Siphonia elastica, and, though our modern industrial rubber has several sources in the Old and New Worlds, the best source of it is Hevea brazilensis of the Amazon basin, and this has been taken to other lands for planting. America is thus responsible in a special degree for this industrial product which is exerting such influence on transport and other aspects of modern commerce. The social problems involved in the rubber business are too well known to need discussion.

Earth nuts (Arachis hypogœa) have spread from South America to Nigeria for cultivation as a valuable source of the refined oil needed in immense quantities for the widely used fine machinery which has marked a further industrial revolution within the last thirty years.

Vegetable ivory is an interesting and valuable American product, and copal (varnish) is another, while the contribution of America to our supply of dyes has been a remarkable one. Brazil wood and Nicaragua wood furnish valuable reds ; indigo was an important culture until artificially made ; logwood is of great value as a source of the dye hœmatoxylin ; cochineal is perhaps the most widely known of all. Fustic and quercitron are others of the many American contributions to this branch of industry.

America has contributed most interestingly to the world's store of narcotics, stimulants and medicaments. Tobacco comes first to one's mind, and one should remember that cigar boxes and pencils are made of the wood of a Central American tree, Cedrela odorata. Cacao, in the form of cocoa and chocolate, is a debt we owe to ancient Mexico, and the plant has carried with it very serious labour problems to S. Thome é Principe off the African coast. Its long period of growth makes organisation and capital a necessity for its cultivation, but Europeans cannot maintain their efficiency in its home in the equatorial damp. Cacao and rubber are two among many equatorial products, the control of which awaits the intervention of a non-competitive authority like the Mandates Section of the League of Nations.

The mountain peoples of America learned long ago the use of coca as a narcotic and as a means of relief for the lungs at high altitudes. Quinine, ipecacuanha, jalap, guaiacum, sarsaparilla, maté, are other important American products, and of these the first has altered man's relations to many parts of the tropics in most marked fashion.

The flavouring, vanilla, may best, perhaps, be mentioned here, and it is also of interest to notice Prescott's opinion that the herbalist's gardens for exotics which seem to have spread in Europe in the 16th century are based upon those of the Mexicans.

Another " spread " to Europe after the voyages of discovery was that of the fine feather weaving and gold ornamentation of the Mexicans, which became established for a while in South Spain.

Though the animal contributions from the New World have been few because of the paucity of American domestic beasts, yet the alpaca and vicuna, derived from the wild guanaco, are important, and their wool has given Bradford (Yorks) special links with South America.

Chili saltpetre has made great changes in Old World farming, and materially helped Germany to delay the decay of her agriculture ; and most of all the American silver mines have exercised remarkable influence on the Monsoon lands by furnishing for a long time in large quantities that which the East desired as payment for the wares Europe wanted to buy.

H.J.F.

The Pacific Ocean on Mollweide Projection, with layer colouring. 1921. Stanford. 4/- paper, 6/6 mounted. 30in. by 22½in.

This is a useful, clearly printed map for general reference, and it should be widely welcomed by teachers, all of whom are now so urgently needing maps of the Pacific of a size to be shown to a class. The map has a great deal of political information on it, and makes rather a speciality of submarine cables for topical reasons.

Mon and Arvon.

A Study in the Development of a Land Surface.

By Edward Greenly, D.Sc., F.G.S.

"MON," the ancient Celtic name for Anglesey, has (in its Latinised form of Mona) long since found its way into classic English poetry. Ar-von, "the country over against Mon," is probably (outside Wales) unfamiliar save as incorporated into "Caer-yn-ar-fon" (Carnarvon), "the fortress in Arvon." Carnarvonshire is an illegitimate expansion ; the true geographical Ar-von, which is physically almost one with Mon, being the tract of country some four or five miles wide, which lies between the Menai Strait and the great Welsh mountain-land.

Now, if from the ridges of Bangor, we look across to Anglesey, the sky-line of that island, some 270 feet above the sea, is, though somewhat rugged, extraordinarily straight and even. Crossing over thither and turning to look back on Arvon, we are confronted by the same feature. And, from any good view-point in the heart of Anglesey, that mysterious, even sky-line encircles us almost like the horizon of the sea. The region is perhaps unexcelled in structural complexity, but no matter what the nature or the relations of the rocks, be they hard or soft, soluble or insoluble, massive or laminated, dipping at low angles or at high, plane or contorted, all are shaved off indiscriminately so soon as they rise to the level of that line. It is, in fact, the profile of a 270 ft. plateau, which has been called (see "Geology of Anglesey," p. 779) the Menaian Platform. Whether it be an old base-level of subaerial erosion or a level of marine planation has not yet been fully determnied.

It is not, however, the only old plain of which we have evidence. For in Anglesey there are nine isolated hills of true monadnock type, which with one or two in Arvon and a terrace at Bethesda must be regarded as the scanty surviving fragments of an older platform at a height of about 550 feet. Along the south-eastern confines of Arvon the mountains rise very sharply, their first spurs affording most impressive prospects of the wide expanse of the sea-board platform region.

There is good evidence for ascribing both these ancient plains to some part of the Pliocene Period, which accords well with the view of them as base-levels reached in the course of the erosion of the adjacent mountain-land, a process which may have been far advanced by that time, if, as there is reason to suppose, it had begun somewhere about the earlier part of the Miocene epoch. Geologically we are apt to look upon the Pliocene period as comparatively recent, and so, relatively considered, it is, yet to stand upon the Bethesda terrace, and gazing at the faint blue forms of the remote monadnocks, to visualise the waste involved in their isolation arouses a sense of well-nigh dumb amazement.

The history of the development of Mon and Arvon is (after the isolation of the monadnocks, of which no details are now available) the history of the dissection of the Menaian Platform. Obviously that must have extended far beyond its present limits, and there is evidence that its outer parts were composed of somewhat friable Mesozoic formations enclosing a hard nucleus of Palaeozoic and older rocks. During and after its elevation its outer parts were cut away, but this process would become far slower at the margins of the nucleus. A comparatively stable coast would thus be established, which though not coincident with the present one, was sufficiently related thereto for the designation "Mona" to acquire for the first time a physiographic meaning.

Concurrently therewith, sub-aerial erosion was developing a ridge and valley system, so that the platform country had assumed in early Pleistocene time a recognisable resemblance to its present aspect. There was, as yet, no Menai Strait, but hollows existed by which a discerning, if somewhat prophetic, eye might already have distinguished Mon from Arvon. The features of that age, however, products of long continued sub-aerial decay, must have been far more anguiar and the valleys not so straight or so smooth as those of the country of to-day.

Then came the Glacial episode, wherein asperities became rounded off, great sheets of boulder-clay deposited, and the Menai hollows unified. Finally, during the last Holocene depression the sea was admitted to that valley, and Mon thus delimited from Arvon by the channel of the Menai Strait.

[Abstract of an address to the North Wales Branch of the Geographical Association, March 12th, 1921. A fuller treatment of the subject will be found in the author's "Geology of Anglesey" (Mem. Geol. Surv.), Chap. XXXIV. and pp. 889, 894-6, wherein evidence is adduced and qualifications are made for which there is not space in this abstract.]

Isle of Man Branch of the Geographical Association.

The inaugural meeting of this Society was held in Noble's Hall on Saturday, September 24th, when Mr R. H. Kinvig, of Liverpool University, delivered a lecture on "Some Aspects of the Racial Geography of the British Empire." The lecturer dealt with the racial problems in Australia, Canada, and South Africa, and illustrated his remarks with lantern slides of distributional maps and typical views of the Colonies. Great emphasis was laid upon the need for a "white" Australia, while the varying races and types of race in Canada were shown to be largely correlated with the geological formation. The ladies and gentlemen present to the number of 45 spent a thoroughly enjoyable and profitable afternoon. The Speaker of the House of Keys, G. F. Clucas, Esq., moved a vote of thanks to the lecturer and to Mr F. R. Grundey, Director of Education, for presiding over the meeting.

A short business meeting was held afterwards, the following being elected for the coming year:—

President: Mr F. R. Grundey.

Hon. Vice-Presidents: Messrs G. F. Clucas, W. Cubbon, and R. Lace.

Committee: Messrs F. B. Bunting, J. H. Boardman, and MacQuarrie, Misses M. A. Cannell and Mcleod.

Secretary: Mr P. E. Humphreys, Secondary School, Douglas.

The Association has now 43 full members and 15 local members. This is highly satisfactory for a new branch and augurs well for the future of geographical study in the Island. The next lecture, to be in the Council Chamber of the Douglas Town Hall (kindly lent by the Corporation) on Saturday, October 29th, at 2-30 p.m., is by the Rev. Canon Quine, who will deal with some local features of geography.

The thanks of the new branch are especially due to Mr Lace, of Santon, and Mr R. H. Kinvig for financial support with regard to the initial expenses of the Association.

Teaching Notes—British Climate.

By J. Jones, Homerton.

MANY hard things have been said about our British climate. Some people have gone so far as to say that there is no such thing as climate in Britain—that we only have " samples." Taking this at its face value, is it not something for which we, as teachers, should be thankful? Britain has been well called " the geologist's paradise," on account of the great variety of rocks to be found in such a comparatively small area. Might it not also be called " the teacher's paradise," when that teacher has to instruct his pupils in the climates of the world? The " samples " which we have, I will try to show, can well be used as types of climate experienced in many parts of the world far removed from Britain.

We are all agreed that our teaching should be made as real as possible, and that mere repetition of words such as " winter rains and summer drought," unless they carry with them an appreciation of the type described, are as vain and meaningless as lists of capes and bays. The object in these notes is to suggest that our variable weather can be of use for object lessons of world-wide types of climate, and their effect upon vegetation.

This means, of course, that the lessons must be taught as the opportunities present themselves, and the following are some illustrations of what has occurred within recent years. It would lengthen these notes unnecessarily if all the qualifications and additional explanations that the teacher should include in the lessons were given. The more concrete our teaching is, particularly for young children, the more surely are the foundations being laid for future work. It is suggested that our " samples of climate " are to be used to make our lessons more real.

A Sample of the Mediterranean Summer Type.

1. The present season is an illustration of the " summer drought " regions. Refer to grass plots and lawns, cricket fields, tennis courts, playing fields, with their parched, brown grass, and we have at once an excellent object lesson that Mediterranean lands, with their summer drought, are not " grass-lands." A little closer observation shows us that the dandelions and plantains on our grass plots, with their deep roots, remain green amongst the brown grass, an object lesson that the vegetation of summer drought lands needs deep roots. Reference to all the work of watering our gardens this year will serve as an illustration that if our summers were always like this, we should be obliged to resort to irrigation.

A Sample of Cloudless Sunshine and Nightly Frost.

2. I am writing these notes at the end of the fourth consecutive day on which we have had continuous sunshine from sun-rise to sun-set—without a single cloud anywhere on the whole face of the sky. One Friday afternoon in the middle of last month (June) the sun temperature was 110 deg. F. at five o'clock. What it was earlier I do not know, but it must have been from five to ten degrees higher. Within thirty-six hours, the temperature, on low-lying lands, fell to 27 deg. F., five degrees of frost—an illustration of the big diurnal range of temperature in the hot desert regions. This same occasion gave a good illustration of " inversion of temperature," for potatoes, scarlet-runners, tomatoes, etc., in the gardens on low-lying ground were all nipped by the frost, but in gardens only a few feet higher no damage was done.

3. In the early summer of last year a period of four dry weeks was broken one afternoon by a torrential rainstorm. The ground was so hard that on the level grass lawns the rain could not drain away, and in twenty minutes the lawns were flooded—an illustration of the first summer rainstorm on the East African plateau, so well described by S. E. White in his book, " The Land of Foot-prints."

A Sample of Continuous Rainfall.

4. Then sometimes we get a really wet summer. Those of us who remember July and August, 1912, will appreciate this. It rained day after day, the culminating point being reached with a rainfall of about 7 inches in 24 hours in the Norwich district, nearly four inches in Cambridge, and similar amounts elsewhere. The results in East Anglia were that rivers overflowed their banks and bridges and railway embankments were washed away. In Wales new ephemeral waterfalls were born, and tons of debris were swept down into the valleys. This might be an illustration of "Monsoonal rains," and once experienced will help us to appreciate the usual heavy rainfall in summer in such regions, with the attendant dangers and difficulties in transport routes.

5. Another very useful "sample" of summer weather that we sometimes get is the following. The plum trees had bloomed early, and no late frosts occurred. Then late in May, when the young green plums were as large as nuts, a week of hot, wet weather came, and in a few days the trees were in bloom a second time—a suggestive sight, plum trees bearing flowers and fruit at the same time. In August the trees carried two distinct crops; from the first bloom, ripe plums, which were gathered at that time, and from the second bloom, green plums, which ripened late in September. This "sample" might illustrate "Equatorial climate," where it is always hot, and rain may fall at any time, and so the trees are always green, and may bear flowers, unripe and ripe fruit all at the same time.

6. But now to pass to the other extreme. The early part of last December gave us a "sample" of really cold weather. For three days and nights the thermometer remained at anything from twelve to twenty degrees below freezing point. The river froze in one night, and people began to talk about the glacial period. Now we have only to get our pupils at the time to imagine such conditions existing not only for three days, but for three months, and then they will appreciate what "interior continental" winters are like in the cool temperate belt. Many evergreens from more southern lands, which can stand the usual English winter, were killed by this unusual "sample."

7. If observations are made at the right time, it is easy to show that cloudy winter-days often are warmer than sunny winter-days, but that sunny summer-days are usually hotter than cloudy summer-days. The text-book statements that temperature in the British Isles is controlled by the sun in summer and by the sea in winter, and that January isotherms run north and south, and July isotherms run east and west, may thus be made intelligible to the student.

But I need not multiply illustrations. It is sufficient to say that if we will only make use of thunder-storm, wind-storm, blizzard, calm, cyclone, anti-cyclone, when they occur in our locality, as types of prevailing conditions in other parts of the world, the vagaries of the British climate can be pressed into the service of the geography teacher with good results.

School Economic Atlas. Bartholomew and Lyde. 5th Edition. Oxford Press. 6/-. 1921.

This well-known work shows some changes as compared wth the first edition. It now includes an orographical map of Central Europe, on which the political frontiers are indicated in subordinate fashion, and an orographical map of the Mediterranean is also given. The Mercator orographical of the world is arranged to show both the Pacific and the Atlantic complete. The introduction is longer and the graphs, etc., take statistics up to 1910. The colouring is on the whole rather less satisfactory, and the register of the colour printing less accurate in certain cases.

The Drakensberg.

By R. U. Sayce, M.A.

THIS slight sketch is the result merely of a week or two spent among these mountains. It naturally makes no attempt to be a full description, but aims at giving a very general outline of an area which would repay a serious investigation. The Drakensberg Range forms the western boundary of Natal. On top and beyond lie the Orange Free State and Basutoland. The range is really a huge escarpment due to erosion. The portion described in this article is that in the neighbourhood of Mont aux Sources (11,170 feet), the highest point in Africa, south of the Zambesi. A portion of this area has been set aside, and forms the nucleus of a National Park. A farmhouse has been converted into a comfortable and well-managed hostel. From here the top of Mont aux Sources can be easily reached on ponies, the double journey taking about three days. In order to reach the park, the most convenient way is to travel to the railhead at Bugville by a train, which arrives there on alternate evenings. Next morning a wagonette, drawn by ten mules, will be ready for the trek of thirty miles along a veld track, which is now being modified into a well graded unmetalled road, passable for motor cars, when there is not too much water in the drifts.

The general altitude of this rolling plateau country is about five thousand feet. Westward is " the Berg," which when first seen from a distance appears to rise to over ten thousand feet in a sheer, unbroken wall, with a sky-line of peaks, spires and domes, like some gigantic old castle. A nearer view, however, shows that in many places great spurs and ridges reach out for several miles from the main escarpment, and enclose many a deep and rugged glen. The general outlines of these mountains are wild and impressive, yet their chief attraction lies unquestionably in the wonderful colour effects, which, though often constantly changing throughout the day, are of an indescribable beauty about sunrise and sunset.

Geologically the structure is extremely simple, consisting of a sequence of horizontal beds, which occur in the following order :—

Karroo System :—
- Stormberg Series (Rhaetic and higher) :
    - Volcanics—Amygdaloidal shales and ash.
    - Cave sandstone.
    - Red Beds—Sandstones and shales.
    - Molteno Beds—Sandstones, shales, and conglomerates.
- Beaufort Series (Permian—Triassic) : Sandstones and shales.
- Ecca Series (Permian) : Chiefly shales. The underlying Dwyka conglomerate is not exposed here.

Owing to the erosion of the shales, which weather into small " mushy " fragments, the overlying sandstones of this series tend to form steep cliffs. This is particularly applicable to the cave sandstone, a pure, creamy white formation, 200—300 feet thick. It is practically devoid of any structure in the way of stratification or joining. Throughout the locality its outcrop occurs as a perpendicular or overhanging face. The upper Tugela cuts through it, forming a narrow gorge, often not more than from four to six feet wide. As the walls of this gorge overhang in many places, it has appropriately received the local name of the Tunnel. The sandstones therefore provide many rock-shelters and shallow caves, which have been used as habitations by the Bushmen, sometimes after a certain amount of modification. On these sandstone faces the inhabitants have left many of their paintings.

The lavas form the upper part of the Drakensberg escarpment. The vesicles have been filled with quartz, agates and chalcedonies. As the upper layers have been removed by denudation, the surface is strewn with chunks of chalcedony, in many places as thickly as the English Downs are covered with flints. The nodules vary in size. A casual search discovered some up to six or eight inches in diameter, and they may occur considerably larger. They provided the Bushmen with the necessary raw material for their arrowheads, and their chipping grounds are frequently found in the neighbourhood of their rock shelters.

Climatic records for this area are naturally of the scantiest ; yet some points of interest may be noted.* The increased insolation at these altitudes is shewn by the colour changes of species of plants which extend from the coast to the Berg. Thus *Dierama pendula* has pure white flowers on the coast, pink in the midlands, and deep purple on the mountains.

During the winter, anti-cyclonic conditions are regularly experienced. The air, cooled by radiation at the higher levels, sinks into the valleys, which in consequence suffer from frost and mist, when the mountain tops are free from them. This inversion of temperature is very marked throughout Natal, and has an important bearing on the distribution of such crops as sugar cane and oranges.

Snow may fall on the Drakensberg at any time during the winter months ; indeed, it has been seen in each month of the year. As a rule it is soon melted, and therefore it has no retarding effect on the spring vegetation. On the contrary, it sometimes provides the moisture necessary to give the plants an early start, since the period of rest is here due to drought rather than to cold.

The chief rain-bearing winds come from the south-east. Consequently sharp rises, or escarpments, facing this direction, receive the highest rainfall. The larger valleys are comparatively dry during the wet season. During this period the mornings are usually clear, clouds gather in the afternoon, and reach a climax in a violent thunderstorm ; towards evening the sky is usually clear again. Owing to the greatly diminished pressure at these altitudes, evaporation is greatly increased, and many of the plants show xerophytic characters. Moreover, in the early spring foehn winds are of fairly regular occurrence, and shelter from these is a very important factor in the distribution of bush.

The prevalent vegetation of the plateau and foothill region consists of a fairly continuous covering of grasses from about twelve to fifteen inches long. In winter they turn a bright crimson, and form a wonderful mass of colour as a setting for the plantations of dark green wattle, with their laburnum yellow flowers. The climax of the natural tree vegetation is the Bush, which occupies the most favourable situations, i.e., such as enjoy (a) a maximum precipitation, (b) a rapid cold air drainage, (c) a shelter from dessicating winds, and (d) suitable conditions of soil and exposure. It is therefore found most frequently in shallow depressions of sufficient gradient on the south-easterly slopes. It is absent from the part of the range between Cathkin Peak and Mont aux Sources, where the Drakensberg escarpment runs from south-east to north-west. The Bush formation consists largely of yellowwoods. Since these are evergreens, undergrowth and lianes thrive best near the streams and at the margins. The formation also includes stinkwood, Natal mahogany, red pear, etc.

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*For the accompanying facts of climate and vegetation, I am indebted to a paper by Professor J. W. Bews, M.A., D.Sc., on the " Plant Ecology of the Drakensberg Range " (Annals of the Natal Museum—May, 1917). This paper is a detailed analysis of the Plant Associations of the district, and indicates their relation to the climatic conditions.

The bed of the Tugela below Mont aux Sources is occupied by scrub which extends to a height of about seven thousand feet. The trees are usually from six to fifteen feet high. Their branches interlace, and undergrowth is fairly strong. The natives avoid these areas after dusk, because of the discontented spirits, who waylay and attack belated travellers.

On the hill slopes below the cave sandstone, i.e., generally below six thousand feet, the most characteristic formation is the Protea Veld. The sugar bush trees are xerophytic, with dark-green glossy leaves. In spring they develop very handsome, honey-laden flowers. The trees are about twelve feet high, and grow dotted about at intervals over the veld. Here and there, but generally in the more sheltered spots near water, are numbers of tree ferns. On the top of the Drakensberg escarpment, the country consists largely of broad open valleys. Here grow several kinds of heather and tufted grasses.

The country lying at the foot of Mont aux Sources is but thinly populated. The original Bushmen are now extinct, but their traces remain. On the sandstone faces of the caves and rock shelters are many examples of their paintings, representing animals of the chase and incidents of their hunting and cattle-raiding life. They might be regarded as the Bushman equivalent of the modern illustrated newspaper. The characteristics of this art and its parallels are too well known to require a detailed description.

When Tshaka overran and depopulated Natal, in the early part of the last century, a number of refugees found a precarious refuge in these mountain recesses. Having been despoiled of most of their herds, they were frequently reduced to cannibalism. Their descendants now lead a more tranquil and less exciting life in the native locations, or squatting on the white men's farms. They are a mixed people and vary greatly in physique. Some individuals have the characteristic build and features of the negro, but in others the features are much more refined, and the colouring may be much lighter. One often sees prominent, sharply defined chins, with well developed beards and moustaches. The ability to grow these facial adornments greatly increases the respect in which a man is held by his people.

The occupation of these natives consists of a little very crude agriculture and some herding. The animals are driven on to the veld, where they must forage for themselves. Animals requiring the least attention, such as dogs or poultry, are apt to fare very badly at the hands of the Kaffir. Sheep are not kept as a rule for fear of fines for scab, which the native is not quick to detect. Herds of cattle in charge of boys, who often move about on the backs of the calves, are dotted about the countryside. Goats are frequently kept, and so, too, is the domestic pig, which is now eaten, though until fairly recently it was tabu.

The agriculture, such as it is, is in the hands of the women. No fertilisers are used: a few seeds are put into the alluvium about the rivers, and the harvest is reaped in due course. If this should be deficient, the men will go to a farm, or preferably into the towns, for a month or two, and earn enough money to tide them over until the next harvest. The principal cultivated plants are maize, millet, and pig-melons.

The main food of the people is a porridge made from mealie (maize) meal, ground by the women by means of a round pebble and a larger stone, which becomes more and more concave with use, until it resembles a stone trough. Milk is allowed to stand in a calabash until it is curdled. The clear liquid is then drained off, and the snow-white solid, "maas," is then eaten and appreciated, as it should be. (It is strongly recommended with stewed fruit.) The chief drink among the men is beer, made from the millet. In appearance it is like a mixture of coffee and thin porridge. The taste is rather sharp, and delightfully cool.

The dwellings hereabouts vary somewhat in construction. Here the hemispherical hut of woven reeds and grasses occurs side by side with the circular hut with vertical walls and a conical roof. Over the main escarpment, in the Eland River Valley, all the huts appeared to be of the latter type, which I believe is also characteristic of Basutoland. The building material of these vertical walls may be either wattle and daub, lumps of a lateritic soil, or dressed blocks of dolerite, cemented together with mud. The stone-built huts are, of course, the most modern. They are being used quite largely as sleeping annexes to some of the hotels, and are extremely comfortable, their thick roofs of thatch helping to maintain an even temperature inside.

A feature, which is always to be found here, but which is generally absent from the more low-lying districts, is the " skerm " or screen of reeds about five feet high. This is constructed about the entrance to the hut, and acts as a wind screen.

A group of dwellings consists of the living huts, each wife having her own, and sometimes a number of stone huts. The latter are often not more than three or four feet high. A special one is made as a store for the mealies. It is about four feet high, and has a raised floor, as a protection against rats and mice. No group is complete without its cattle kraal. This may be a small enclosure, fenced in by some upright stakes and a few strands of wire, but a more elaborate enclosure is frequently made. This is about 30 feet across, and may be either circular or rectangular ; the walls are from three to four feet high, and are built of dry stone masonry. When abandoned and allowed to fall into disrepair, they bear a close resemblance to the smaller duns of the Western Highlands, and to some of the Caerau of Wales. Their sites, too, support this resemblance. Excavations might even reveal human remains, for it was here that the chief was buried.

Each settlement is situated on the crest of a spur, or shoulder, often a considerable distance from water. One of the chief qualifications for a building site is that it should catch the beams of the morning sun as early as possible. Possibly it is also due to the native recognition of the inversion of temperature at night. I have noticed this contrast between the temperature of the valley bottoms and hill slopes when sleeping out in the Eifel country, and when motoring on a winter's night in Wales. Not only does the temperature fall lower in the bottom of the valleys, but the morning mists often hang there long after the hill slopes have received the early sunshine. This may have some connection with the fact that out of twenty-seven examples of " hill top " camps in Cardiganshire, not one is below the 300ft. contour.

The chief line of communication is the unmetalled, but quite well graded road, which has recently been cut between Bugville and the Koodoo Hostel, in the National Park. The native tracks are similar to the indefinite tracks which are found everywhere on the steep hillsides of Wales and Scotland. The means of transport vary. One often sees a string of native women and girls, followed by children in single file, the smallest, apparently about three years old, coming last. On the head of each is a bundle, varying in size from, say, a sack of mealies, carried by the women, to a large, round pig-melon, beautifully balanced by the giant in the rear.

The native men, whenever possible, follow the universal Basuto custom of riding on horseback. The horses, or rather ponies, are unshod, and have acquired a wonderful power of hill climbing. They will make their ways up among the rocks where a pedestrian might often use his hands to assist his legs. Until one has had some experience of their skill, it is a little disconcerting to find oneself riding along a path, not more than a foot wide, with one stirrup occasionally grazing the face of a rock, and the other dangling over the top of a tree. Walking and riding in this way are the only two means of following the main track up into Basutoland. Luggage must be taken on pack ponies.

Among the foothills, where wheeled traffic is impossible, a kind of rough sledge is used for hauling heavy loads. This is a crude version of the wooden sledge still used in the hilly districts of Wales and in the Eifel. It consists of a forked trunk of a tree, quite untrimmed, except for a few cross pieces to support the load. It is generally drawn by oxen. In order to adapt it to such loose loads as mealies, a few upright sticks, two to three feet long, are driven into the sledge, and between these, reeds are woven to make a kind of basket built on to the sledge. On the new road, and on the open veld, wheeled traffic is employed. The vehicles may be drawn by either oxen, horses, mules or donkeys. The use of the American motor car is becoming very common. English cars are made with high gears suitable to good roads, but they are said to be of very little use on these rough tracks and steep gradients. The reliability of English manufactures is greatly appreciated out here, and if English manufacturers would adapt their cars to local requirements, they would probably find a good market in this country. Moreover, since horse sickness practically puts horse traffic out of the question in a large part of Natal, and since the railway system is still largely undeveloped, the immediate development of the country will depend to a great extent on motor traffic.

As already stated, some of the land below Mont aux Sources has been set aside for a National Park ; some is reserved as native locations. The remainder is in the hands of white farmers ; many of these have their main property in the Orange Free State, and send their stock down to the foothills of the Drakensberg for winter grazing, when the uplands are suffering from the anti-cyclonic drought. This transhumance applies only to sheep. Cattle may come down to Natal, but are not allowed to return, for fear of East Coast fever. The very few available passes in this area are carefully guarded by police.

Even the baboons show a seasonal migration, coming down to the mealie fields in summer and retiring to the mountain fastnesses in winter. A fall of snow on the upper part of the range, however, sends them down to seek milder conditions at lower altitudes.

The potentialities of this foothill region are very considerable. The soil is deep, though lacking in lime and chemical salts. Sunshine and water are plentiful. Many streams, crystal clear, come down from the hills, and do not fail during the dry season. Every acre of the country could be irrigated. Peaches and many kinds of fruit thrive. Quite healthy looking peach trees may sometimes be seen near a native kraal, which is a testimony to the natural conditions. The labour question might provide some difficulty, for in the ideal of the native male, continuous labour finds little place, especially labour in the fields, which is woman's work. Nevertheless, this difficulty can be, and is, overcome, and there are already some prosperous farms growing up in the district.

The Teaching of Geography. By Branom. 289 pp., 4¾in. x 7¼in. Ginn. 8/6.

This book should prove exceedingly valuable to teachers in the British Isles, since it gives a rather fresh American viewpoint. The project or active method as used with considerable success in so many American High Schools is set out in very considerable detail, and is followed by new and interesting material on the measurement of results of class-room teaching. There is a bibliography of carefully selected references appended to each chapter. R.M.F.

A Course in Geography for Schools.

I. PRELIMINARY TRAINING to occupy first three years of school life. See Section II. of 'Notes.'

II. SYSTEMATIC FOUR-YEAR COURSE.

First Year—DESCRIPTIVE TREATMENT OF THE BRITISH ISLES.

Second and Third Years—WORLD GEOGRAPHY, in two distinct courses :—

(a) PHYSICAL GEOGRAPHY—(one period a week).

Movements of the Earth. The Seasons. Day and Night, etc. The distribution of land and water. The Configuration of the Continents. Land Forms and the Agencies modifying them.

The Wind-belts. The broad distribution of temperature and rainfall. Climatic Regions. Vegetation in relation to Climate.

(b) HUMAN GEOGRAPHY OF THE CONTINENTS—(two periods a week).

The order as follows :—1. South America.
2. Africa.
3. Australia.
4. Asia.
5. Europe or North America (See below).

Lines of treatment in the case of each Continent :—

A. General description of the physical conditions and vegetation of the Continent, with the chief natural divisions.

B. Each great Vegetation Zone as a unit, e.g., in South America : (a) The Equatorial Forest, (b) The Tropical Grasslands, (c) The Temperate Grasslands, (d) The Desert, (e) The Mountain-belt, (f) The Coastal Temperate Forests. Treatment of each Vegetation Zone : (1) Description of the Natural Features and Climate, (2) The Products, Natural and Cultivated, in relation to the Physical Conditions, (3) The life of the people in relation to the Products and to the Physical Conditions, (4) The Communication of the region with the outside World—Means and Method of Transport.

C. The distribution of States in relation to the Natural Regions.

Fourth Year—

(a) Intensive Treatment of the Geography of either North America or Europe.

(b) Intensive Treatment of the Geography of the British Isles, with special reference to economic and social conditions.

NOTE.—A Course on the Geography of the British Empire might be substituted in the last year.

NOTES ON SCHEME.

I. THE 'SCIENTIFIC' TREATMENT OF GEOGRAPHY IN SCHOOLS.

There is general agreement (a) that our object in geography teaching is not merely to impart knowledge, but includes also the training of the reasoning faculties and imagination of children, and, above all, the development of a broad outlook ; (b) that although it is impossible to present the whole science of geography in schools, it is practicable to handle geographical data rationally, and to relate the distribution of different phenomena scientifically during the last four years, *provided* that the children receive a good preparatory training (See II. below) ; (c) that such a treatment should involve as much training of the children in thoroughness and precision as was entailed by the older system. The teacher should first select the 'facts' very carefully, but these should be driven home with complete accuracy, e.g., the position of important towns should be known exactly ; not otherwise can the significance of their sites be appreciated.

II. PRELIMINARY TRAINING FOR THE 'SCIENTIFIC' TREATMENT.

This would occupy, according to the scheme proposed, at least three years (seven to ten), and the work throughout should be carefully planned to prepare the children for the Four-year Course. Whatever methods may be employed, the essential objects of this preliminary training are:

(a) To interest the children in the geographical aspects of their own immediate neighbourhood, and so to use it as to give them concrete ideas about the work of Nature and of man's relationship to Nature.

(b) To prepare them for the study of World Geography by giving them a vivid interest in the life and customs—especially the normal family life—of the peoples of other lands and environments by means of stories, pictures and graphic descriptions. Preliminary ideas of distance, direction, and locality should be conveyed in connection with these lessons. It is also important that throughout these stages the active co-operation of the children shou'd be secured by encouraging them to describe and, where possible, to draw or act what they actually see or what they picture in imagination.

(c) To lead them by slow and easy stages to understand and to interpret orographical and other distributional maps. Good orographical maps are essential in the Four-year Course, but the ground must be carefully prepared if the children are really to appreciate their significance and meaning. A good map is like a piano which will only yield up its secrets to those who have been taught to understand its mechanism and its possibilities. The right method of approach is probably indicated by the sequence: pictures (including photographs), picture-maps, maps.

III. THE TEACHING OF PHYSICAL GEOGRAPHY AND ITS RELATION TO HUMAN GEOGRAPHY.

The scheme suggests that in the middle portion of the Four-year Course the subject matter of Physical Geography (including essential Mathematical or Astronomical elements) may be separately presented as a coherent and self-contained body of knowledge. A connected casual treatment of the natural phenomena involved can only be attempted with success among older children, although much preparatory work can be done in the preliminary period, especially by means of practical observations. At this early stage it ought to be very intimately related to Nature Study, and it is possible to devise a scheme whereby Nature Study passes gradually into local Physical Geography, and that again into a more systematic course in general Physical Geography, such as is contemplated in the scheme.

To give children a real interest in Nature and to cultivate in them the habit of watching her work, and especially of appreciating its unity, is certainly a vital object of the teaching of Physical Geography.

But another, of quite equal importance, is the presentation of Physical Geography as the basis of good Human Geography. The study of the interaction between man and his physical environment and of the progressive use which he can make of any particular combination of natural conditions is, perhaps, the highest end of a normal course in Geography. This involves the marshalling of the data of Physical Geography in such a way as to make vivid and definite Nature's setting of man's life in the Monsoon lands, the Mediterranean Basin, the Steppe, the Equatorial Forest, and other great World Regions. The scheme suggests that in the course on the Human Geography of the Continents (Second and Third Years of the Four-year Course), Physical Geography should only be introduced in order to give this natural setting of the stage on which the human drama is being played. Its effects upon man's life and no less man's use and modification of it would be the principal theme. The *explanation* of the physical phenomena involved would be left to the parallel course, and considerable confusion may be avoided at this point by keeping the two sets of issues distinct. The two courses should, however, be in the hands of the same teacher and should, of course, throw light on each other.

But, in the final stage of the Four-year Course, when the elementary physiographic principles had been mastered, the Physical and Human Geography, as illustrated by the Continent (or large Natural Region), selected for more intensive study and by the British Isles, should be brought together in one course, and the whole Geographical sequence or argument can be presented at any rate in outline.

This order of treatment is suggested as one method of steering between the Scylla and Charybdis, which all Geography teachers have to encounter, the Scylla of a Physiography unrelated or insufficiently related to man's activities and strivings, and the Charybdis of a Human Geography resting on an insecure and imperfectly appreciated physical basis.

NOTE.—The treatment of Human Geography by Continents (suggested in order to ensure an outline treatment of the whole World) can be modified or adjusted to meet those cases where lands situated in different Continents clearly belong to the same natural division of the Earth's surface, e.g., African lands, north of the Sahara, and the Mediterranean Lands of Europe.

IV. THE TEACHING OF WORLD GEOGRAPHY.

It is certain that in future greater stress will have to be laid upon that aspect of Geography teaching which introduces boys and girls to the problems involved by the complex relationships of different lands and peoples. This implies a well-devised treatment of World Geography, in which special attention is devoted to the human aspect and to the inter-dependence of the different regions of the earth. There is much to be said in favour of a course on the Geography of the British Empire, but it should always be preceded by a wider treatment of World Geography. In the scheme it could be substituted for the subjects proposed for the Fourth Year. In any plan of training in National or Imperial Citizenship, Geography must occupy an important place, and one of its special functions in the schools should be to develop in boys and girls an intelligent interest in the relations of their own country and Empire to other lands and peoples.

V. EQUIPMENT.

For the successful working of the scheme outlined above, a certain equipment in Maps, Pictures and Books is essential. The list given below may be considered a *minimum* equipment for any School, Elementary or Secondary, where Geography teaching is an integral part of the curriculum.

(a) WALL MAPS.—A good physical (orographical) Map of the World (preferably on Mollweide's Projection). A good physical (orographical) Map of each of the Continents and of the British Isles.

There is a large choice of such maps, but the following can be specially recommended :—

(1) World on Mollweide's Projection (80 x 63 inches), 30s. (George Philip and Son).

(2) Physical Maps of the Continents and of the British Isles in the series of Comparative Wall Atlases, edited by J. F. Unstead and E. G. R. Taylor. (George Philip and Son). Price of each Map, mounted on cloth, rollers and varnished, 7/6, or the Series of large Physical Wall Maps (50 x 42 inches) of the Continents and of the British Isles, published by W. and A. K. Johnston (Edinburgh). Price, 14s. each map.

(3) Oxford Wall Maps. (Structure, Climate, Vegetation, and Natural Regions). Clarendon Press.

(b) A GOOD SERIES OF PICTURES, illustrating land-forms, vegetation, and life in other lands.

(c) There should be in each school a few standard works of reference which every teacher of Geography can consult. These should include the following standard books:—

GENERAL AND REGIONAL GEOGRAPHY.

e.g., 'General and Regional Geography.' Unstead and Taylor. (Philip. 8s.).
or 'Essentials of World Geography,' by same authors, 3s.
or 'A Text-book of Geography.' Andrews. (Arnold. 7/6).
or 'The International Geography,' edited by H. R. Mill (also published in separate parts) (out of print).

PHYSICAL GEOGRAPHY.

e.g., 'An Introduction to Physical Geography.' M. I. Newbigin. (Dent. 4/6).

ECONOMIC GEOGRAPHY.

e.g., 'Industrial and Commercial Geography.' (J. Russell Smith. Constable, 21s.).
or 'Commercial Geography.' C. G. Chisholm. (Longman's). N.B.—Revised and extended edition in preparation.

HUMAN GEOGRAPHY.

e.g., 'Principles of Human Geography.' Huntingdon and Cushing. (Chapman and Hall). 21s.
or 'Human Geography.' Brunhes. (Rand McNally). 32/6.

BRITISH ISLES.

e.g., 'Britain and British Seas.' H. J. Mackinder. (Clarendon Press). 8/6.
Also 'Modern Geography.' M. I. Newbigin. (Home University Library). 2/6.
'Man and his Work.' Herbertson. (Black). 3/6.
'Geography and World Power.' Fairgrieve. (London University Press). 5s. 2nd Edition.

A GOOD ATLAS.

e.g., 'Advanced Atlas of Physical and Political Geography.' (Bartholomew. 12/6).
or 'Senior School Atlas.' (Philip). 10/6.

NOTE.—For articles on the teaching of Geography, teachers are recommended to consult the 'Geographical Teacher,' published for the Geographical Association, by Geo. Philip and Sons, Ltd. For terms of membership of the Association, apply The Clerk, Geographical Association, 1, Marine Terrace, Aberystwyth, from whom also back numbers can be obtained. See also 'Geography in Education' (Geo. Philip and Son, price 2s.). 'The Teaching of Geography to Children,' L. Winchester (Methuen, 2s.). 'The Teaching of Geography and History,' H. J. Mackinder (Geo. Philip and Son, 2/6). 'The Teaching of Geography in Elementary Schools,' Archer, Lewis and Chapman (Black, 7/6).

September, 1921. P. M. ROXBY.

The World. BY L. BROOKS. 556 pp., 4¾in. x 7¼in. London University Press. 7/6

This book now completes the projected series of New Regional Geographies, and does not possess the failing so common in books of this type, unsatisfactory balance. The material has been thoughtfully selected and is clearly presented. The illustrations which were a new feature of the earlier books are equally good in this. The exercises are more than tests on text recapitulation; they are thought provoking. T.C.

Changing Values in Economic Geography.

RAMIE,

By Dr. A. Wilmore.

TEACHERS of Geography are quite familiar with the factor sometimes known as Geographical Inertia—the tendency for an industry once established in a district to maintain itself, even though some of the early conditions of success no longer operate. The woollen industry of Montgomeryshire, the pencil industry of Keswick, and some phases of the pottery industry of North Staffordshire are familiar examples. It is, of course, obvious that those who own industries, whether they be capitalists in the commoner sense, or shareholders or directors, will not readily suffer an industry to be extinguished. Increased cost, let us say, of transport, will be met to some extent by economy in production,—that is, increased difficulties in one direction will stimulate experiment and research in another. That there is a limit to this inertia is obvious enough when we look over the country and see the great number of derelict industries,—derelict, that is, so far as a particular region is concerned. The iron industry of the Weald, now lost for nearly a century ; the little water-mills of the Pennines, which spun and wove cotton and woollen goods up to 1840-1850 ; the jet industry of Whitby, are instances of local industries in which the most resolute inertia has failed to save them.

Another factor is ever at work, that which has been well called " the Factor of Changing Values," which is due to new fashions, new discoveries, new sources of raw material, migrations of labour, new relations between capital and labour, the incidence of rates and taxes, and other causes less readily defined. The present distribution of industries may be looked upon as the balance between these two great factors—inertia on the one hand, changing values on the other. The subject of this essay affords an illustration of the inter-relation between the two factors, and it is largely from that point of view that the writer proposes to treat it.

The VEGETABLE FIBRES that are used in the manufacture of textiles (woven goods) are, as everyone knows, capable of classification in several ways. The best, from a Geographer's point of view, is that proposed by Dewey in the Year Book of the U.S. Department of Agriculture in 1903, into (i) the cottons, with soft, lint-like fibres, ½-inch to 2-inches in length, obtained from the seeds of different species of cotton plants ; (ii) the soft, bast figures, 10 to 100 inches in length, obtained from the inner bark of plants by some process of " retting " ; these are flexible fibres of moderately soft texture, and include flax, hemp, jute and ramie ; (iii) the hard, or leaf fibres, 1 to 10 feet in length, obtained from the tissues of leaves or leaf-stems. This group includes Manila ' hemp,' sisal, New Zealand ' hemp,' henequen, and Mauritius ' hemp.'

Each fibre has its own peculiar physical properties which distinguish it from the others, the more important of which are tensile strength, elasticity and torsion. The smoothness of its surface has also to be taken into consideration, as a fibre which is smooth and regular is very difficult to spin ; one fibre cannot readily be got to combine or join with the next fibre, and so produce a continuous thread or yarn.

The great textile world is always on the look-out for new fibres and new modifications, either to weave or ' net ' into fabrics alone or to mix with other fibres. Owing to the decreased yield of the American cotton fields, and to the continually increasing demand, the search for possible substitutes has been all the keener of recent years. This tendency has given ramie its chance, but although it is a fibre of exceptional promise, it is proving to be one of very great difficulty of treatment, and its manufacture is not yet out of the early experimental stages. Many small fortunes have already been lost over these experiments, and it would appear not unreasonable that a country like ours, which is so dependent on external supplies of vegetable fibres, should take the matter up as a national concern. The cost would be comparatively trifling.

There are two distinct fibres which are frequently included under the general name RAMIE. The first comes from the rhea plant, BOEHMERIA TENACISSIMA, and the name ramie belongs more strictly to the fibre from this plant. It grows best in sub-tropical and tropical countries, and large quantities are produced in India, the islands of Malaysia, and the coast lands of Mexico. The other plant belongs to the same genus of stingless 'nettles,' and is usually known as China grass in the trade. The rhea plant has leaves which are green on both sides, and is sometimes called green ramie ; the 'China grass' plant has leaves which are whitish underneath, hence it is known as white ramie, and the botanical name is BOEHMERIA NIVEA. China grass will grow in more temperate climates, and is largely produced in China and Formosa. Attempts have been made to grow it in Southern Europe, but not with any great success. A recent writer in a book on the technology of the subject states that this is because the winters are TOO COLD! The geographer will not need to be reminded that a Sicilian winter is much warmer than one in Shanghai. The same writer states later that a hot and rainy climate is the most suitable, and that dry heat kills the plant. It is obviously the Mediterranean summers that are unsuitable, and not the warm, moist winters. One would suggest that approximately similar climatic conditions would be found in the coast lands of Southern Queensland and Northern New South Wales, the coast lands of Natal, and the east of Southern Brazil and Uruguay. Madagascar might also furnish suitable conditions.

Geographical readers will no doubt know that the bast fibres of flax, hemp, and jute are separated from the 'bark' of their plants by a fermentation process known as retting, and those who have been in the neighbourhood of a flax-field in the North-east of Ireland when the 'sun and rain' retting has reached an advanced state, will appreciate the statement that the fermentation involves the decomposition of the organic matter of the cortical part of the plant.

The bast fibres of ramie cannot be separated from other tissues by an ordinary retting process, and this is the first great difficulty in the way. Getting rid of the 'cortex' by hand, as it is still done in China, is a costly process, because a woman can only produce a few pounds of fibre per day. It should be done in the green state, however, as when the stems are dried the process is most difficult. Many parcels of undecorticated 'China grass' have reached this country, and have fetched low prices on that account. Many machines have been patented, but the process is still in the experimental stages. English, United States, French and German machines have been made to do the work successfully—at a price ; but there is still room for advancement. Some of the best English machines have been made in the West Riding of Yorkshire, where the knowledge of the treatment of flax has been an advantage. A French machine is, however, claimed to be the best up to the present time.

There is a great deal of interstitial gum to be got rid of, and this process —called 'degumming' in the trade—is now being made the subject of further extensive experiments. The aim is to make the fibres white at the same time, that is, to bleach as well as get rid of the gum, and at the end leave the fibre in a soft, pliable condition. The process involves the use in various ways of alkalies, hydrochloric acid, sulphur dioxide, chlorazone, and potassium permanganate. The details are of a technical nature and outside the domain of the geographer. It will be noted, however, that there will be at least some tendency towards locating the growing industry near to the great regions of chemical industry, and where textile machinery is already manufactured. These factors are attracting most of the experiments concerned with ramie towards Manchester and district, or Leeds and Bradford.

Ramie fibre, when bleached and degummed, has a most attractive appearance ; it is fine in texture, has a high lustre, and is exceptionally white in colour. It is also very strong, being probably the first of all vegetable fibres in this respect. Its average tensile strength is about three times that of hemp, four times that of flax, and eight times that of cotton. As already hinted, the fibres are also very long. The drawbacks are its lack of elasticity and flexibility, especially the latter. Consequently it is somewhat harsh to the feel, and fabrics produced from it are stiff and unyielding. The great problem at present is so to decorticate, degum, and then spin, as to produce a more kindly yarn. Experiments are now being carried on in this direction. The Germans seem, for the time, to have got ahead of us in this respect, probably because they were shut off for so long from supplies of cotton, and the other vegetable fibres which they could not grow themselves. Sheer necessity stimulated research.

At present ramie fibre is widely used in making the ' textile ' basis of incandescent gas mantles, where its length of fibre and its tensile strength are of advantage. There are several works in the Manchester province which use ramie, or ramie mixed with other fibres, for this purpose. Take the word ramie, add the letter " z " to the end, and write it backwards, and the reader will recognise a well-known and much advertised brand of gas mantle. Ramie fibre is also much used in the making of various kinds of rope and twine. Fishing nets and bags made of netted fibre often contain much ramie mixed with other kinds, or consist entirely of it. It has not yet, however, fully established itself as an ordinary weaving fibre, owing to the drawbacks mentioned above. It is, however, being used in fabrics made of mixed fibres, and this would seem to be the most promising direction for experiment. From time to time, very beautiful blouse materials from Japan are being offered in Manchester and Bradford. Many of these are made of ramie and cellulose or artificial silk, and present a most attractive appearance ; the wearing qualities are still somewhat doubtful. The future developments will almost certainly be in the districts round Manchester and Bradford, where the knowledge of mixed fabrics is considerable, and where the conditions of successful experiment ought to be readily obtainable. In any case, ramie is likely to prove important in the near future. An experimenter will one day be successful, and a fibre which has not been very widely used will suddenly assume new importance. Its production in increased quantities will at once follow, and other suitable climatic regions will begin to grow it ; and it will be the duty and the pleasure of the geographer to watch and explain these new developments to his pupils.

First Annual Report of the Colonial Research Committee. Cmd. 1144. 4d. net. 1921.

This first report begins a new series that should interest teachers, for it sheds light at several points on economic activities at the present time in the Crown Colonies and Protectorates. The fact that Sir H. J. Mackinder, M.P., is the chairman of the Committee gives it an additional claim on teachers. Much interest attaches to the facts noted for ever so many places, and attention is concentrated throughout on developmental possibilities.

Helps to Study of History. 44 :—Geographical Factors. H. J. Fleure. S.P.C.K. 6d. 31 pp. 1921.

Readers of the Geographical Teacher may find it useful to have in a collected form an argument, and illustrations thereof, often used in articles in this magazine.

Irish Geographical Association.

SUMMER SCHOOL. JULY 12TH—22ND, 1921.

THE Summer School organised by the Irish Geographical Association was held in the Royal College of Science, Dublin, by kind permission of the Department of Agriculture and Technical Instruction for Ireland.

JULY 12TH. FIRST DAY.

The School was opened by Mr George Fletcher, F.G.S., Assistant Secretary, Department of Agriculture and Technical Instruction for Ireland, who welcomed the large audience to the opening of what promised to be a most interesting series of lectures and demonstrations. He said he thought they might congratulate themselves that the opening address was being delivered by their President, Professor Grenville Cole.

*Professor Cole, F.R.S., in the course of his address on "The Clearing," said that the development of states and empires was comparable to that of the humblest clearing of the woodland, and often took place compulsorily against forces working from without. The inhabitants of a clearing who managed to hold their own might in time submit to local geographical control, and, in proportion as they did so, they formed a cult of the homeland and cut themselves off from the outer world. The various states in the Ægean area thus occupied separate niches in a Greek façade. Their settlements at the head of drowned valleys offered them little scope and no healthy sense of common action. The internecine jealousies of the clans of Scotland were an outcome of separation in the glens. The settlement of England by the Normans in twenty years showed a compromise of Britons and Saxons with the external world; but insularity of outlook was gradually developed by the protecting ring of waters.

Kairdwan in the Tunisian steppe, founded by Sidi Okba in 670, might be taken as the type of a clearing with a definite religious aim, a seal set consciously on a conquered land.

France had proved herself the heir of Rome in Northern Africa, and had given the Berber race a new safety and new communication; but the outlook of the Arab clearing and the simple desert faith prevail from Tunis to Agadir.

The Roman clearing spread less systematically through a long series of events. It represented triumph after triumph over geographical obstacles, as when Augsburg was founded in consequence of the capture of the Eastern Alps; but over-centralisation round the ancestral camp-fire made the edge of Empire an ever-wavering line.

The most remarkable clearing of modern times was that known as the United States of America, where the federal system had maintained a common interest in a region of marked geographical diversity.

Human geography must be studied in the light of world history, and not of the topography of the King's kraal or of the market place. Only in the larger outlook comprehension and pardon could be found.

The lecture was beautifully illustrated by lantern slides.

JULY 13TH. SECOND DAY.

The second day was opened by Professor Seymour, B.A., B.Sc., National University of Ireland, who, in the course of a highly interesting lecture on "Land Forms and Scenery," dealt with the natural agents of denudation and their effect on the topography of a country.

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*This address is reported in full in the current number of the "Journal of Education."

The different points of the lecture were illustrated by excellent lantern views.

After the lecture, Mrs Mabel Wright, A.R.C.Sc.I., gave a demonstration on maps and map reading.

The afternoon was spent on the Hill of Howth, when, under Professor Seymour's guidance, the members were able to see illustrations of his morning lecture in the varied topography of that district.

JULY 14TH. THIRD DAY.

Professor Seymour gave a second lecture on "Land Forms and Scenery." He dealt in considerable detail with the action of the sea and of ice in the modification of a land surface, and brought home very vividly to his audience how a large part of the topography of Ireland is dependent on earth events of comparatively recent date. He concluded by showing some beautiful slides of types of scenery illustrative of the various natural processes of erosion and deposition.

Mr R. Lloyd Praeger, B.A., National Library of Ireland, and author of "Irish Topographical Botany," etc., gave an interesting lecture on Field Work, in which he pointed out the difficulties which confront the naturalist when he sets out to determine the distribution of plants and animals. The problem in its initial stage is largely one of choosing boundaries, and for the sake of convenience in distributional work in these countries, political boundaries have been adopted, and the forms of plants and animals worked out county by county. Within each county it is found possible to use more natural and geographical boundaries.

The lecturer gave a graphic account of the recent work on the topography of Irish plants for which he was responsible, and which is published by the Royal Irish Academy.

One of the most interesting lectures yet delivered in this course was brought to a conclusion by reference to the important work of the Clare Island Survey, in which the lecturer, in collaboration with other naturalists, completed an exhaustive survey of that interesting island.

Mr Praeger acted as conductor on an excursion to the Pine Forest and Kilakee, where an instructive and enjoyable afternoon was spent in studying the distribution of plants on the Dublin hills.

JULY 15TH. FOURTH DAY.

Mr W. F. Butler, M.A., Assistant Commissioner, Intermediate Education Board, gave a stimulating lecture on the "Map of Ireland in the Sixteenth Century." Sketching the effect of topography on Irish history, he showed the part which the mountains, woods and bogs of Ireland have played in her many wars and rebellions. He dwelt at some length on the political map of Ireland under Henry VIII., and showed by interesting lantern slides how the country was occupied then by the English and native Irish respectively, emphasising the geographical reasons for this distribution.

Mr D. S. Torrens, A.R.S.Sc.I., Demonstrator in Zoology, Royal College of Science for Ireland, followed with a lecture on Astronomical Geography, in which he clearly indicated the methods by which latitude, time, and longitude are determined with our astronomical instruments.

The afternoon was spent at the Royal Astronomical Observatory, Dunsink, where the Assistant Astronomer, Mr C. Martin, personally conducted the inspection, and explained to the members how the various instruments were used.

After a pleasant afternoon, Mr and Mrs Martin hospitably entertained the Association to tea.

JULY 16TH. FIFTH DAY.

The Summer School was entertained by Mr and Mrs George Fletcher at their house at Luggela, a beautiful valley hidden in the Wicklow hills.

Mr Fletcher conducted the party through this valley, which is situated a couple of miles west of Roundwood. He pointed out the extensive evidences of modification by ice-action, including an amazing number of perched blocks transported from the adjoining granite chain and strewn far and wide over the mountain slopes.

Terminal moraines can be seen spanning the valley, and one of these is responsible for holding up Lough Tay. The river which drains this lake into Lough Dan has a meandering course, and affords good examples of the formation of river gravels and alluvium. The Association returned to Bray late in the evening, delighted not only with the beauty of the scenery, but also with the kind hospitality of Mr and Mrs Fletcher.

JULY 18TH. SIXTH DAY.

Mr Hinch, Geological Survey of Ireland, opened the sixth day with a demonstration on the available literature of physical geography, and more especially that having relation to Ireland. He placed on the table for examination by the members a number of books and atlases bearing on the subject, and if one may judge from the interest displayed in them, this feature of the programme was especially appreciated.

Afterwards Mr Fletcher lectured on "Irish Industries and Sources of Power," a subject which, as a member of the Water Power Commission, he has made peculiarly his own. He pointed out the ever-increasing substitution of power-driven machinery for hand industries, and the desirability of such substitution. Recent developments in the transmission of high tension electricity and in the individual driving of small units of machinery by electric power have shown the possibility of bringing up to date the existing hand industries in those districts where they still survive, without any concentration of the workers into industrial centres. The water-power of Ireland, and possibly also its great peat resources, may in this manner become available for the use of the rural population

In the afternoon the members of the Summer School visited the Royal Botanic Gardens, Glasnevin, when the Keeper, Sir F. W. Moore, conducted them round, pointing out the plants and trees of special topographical significance.

JULY 19TH. SEVENTH DAY.

The President, Professor Cole, lectured again to the Summer School, choosing as his subject "The Edge of Africa." He laid stress on the difficulty of entering the continent owing to the absence of an indented coast. The elevation of the whole block had produced plateau-structure over wide areas, and the rivers that wandered over high plains were broken by falls and rapids as they came down to the sea. The Mediterranean edge had none the less been closely linked with Europe ; but the remainder of Africa down to the nineteenth century was known only from the coast. The Portuguese sailed round the Cape and met the Arab settlers at Sofala and Melindi ; but they, and the Dutch and English who followed, were mainly concerned with African ports as halting places on the highway to the Indies. Now, however, penetration of the interior had taken place even by railways from these ports, and the future of Africa seemed to lie in the export of farm and forest products, which must be developed bv co-operation with the native population. Again and again from the edge of Africa white races might be called on to maintain peace among warring tribes, but penetration no longer meant the enslavement of the native in order that we might live comfortably at home.

The members of the Summer School, later in the afternoon, took car to the office of the Port and Docks Board, and were received by the Harbour Master, Captain J. H. Webb, who arranged for the conducting of the party around the harbour in a motor launch. Captain Brady, Assistant Harbour Master, gave an account of the various features of the Port, pointing out the graving dock and ship-building yards, in one of which, strange to say, a boat was being built for a Belfast owner. The grain siloh and oil-tanks, which are prominent objects of recent construction, were passed during the trip, and the very ingenious engineering of the harbour explained.

July 20th. Eighth Day.

Mrs Wright gave a short demonstration on Geographical Modelling, after which Mr Fletcher showed lantern slides illustrative of some of the models exhibited.

Professor Cole opened a discussion on the " Position of Geography in University Teaching," dealing with a pamphlet on the subject by Sir John Scott Keltie, late Secretary, Royal Geographical Society. Professor Cole pointed out how modern is the study of geography in our British Universities, and paid a tribute to the Royal Geographical Society for stimulating and subsidising the teaching of the subject. He emphasised the necessity for the development of the human and historic aspects of this world-wide study, and appealed to the various Irish Colleges to concentrate on this branch of science.

Sir John W. Moore, M.D., followed with a lecture on " Modern Studies in Climate and Weather," in which he dealt exhaustively with the recent developments in meteorology to a large and interested audience.

In the afternoon the School visited the Killiney district, under the leadership of Mr J. de W. Hinch, Geological Survey of Ireland. They viewed the effects of rock-weathering on scenery, and considered the geographical reasons for the position of Dublin as the gate of Ireland. Descending to the strand, they saw the great drift deposits which were placed on the land by the ice sheets of Quaternary times, and picked up bits of the rocky islet of Ailsa Craig, Firth of Clyde, carried to our coasts by the Scotch ice. They walked along the shore to Shankill, where they visited Mr and Mrs Fletcher, who once more hospitably entertained them to tea.

July 21st. Ninth Day.

" Trade and Transport " were dealt with in an instructive lecture delivered by Professor C. H. Oldham, of the National University of Ireland.

With the help of interesting lantern slides, the lecturer described the various kinds of transport used in various parts of the world, from China to New York. New York was about the best example of a bad situation for a capital which the world could show, but owing to geographical necessity, it had been adopted as the capital of American commerce. The cost of transport in the Mohawk Gap dictated the price of all transport from the great mineral-producing centre of the continent. Professor Oldham described Mr Cunningham's model dock system, and illustrated it by views of the Liverpool docks, where the ideal was very nearly realised. The weight of cargo was greater in London, but not the value.

London docks, the river transport of Germany, tremendous and well-organised, were also dealt with in the course of a very vivid and entertaining lecture.

In the afternoon the School visited the Dublin Shipbuilding Yards, by kind arrangement with the Manager, Mr Smellie.

July 22nd. Tenth and Final Day.

Mr E. C. R. Armstrong, Keeper of the Academy Collections in the National Museum, gave a copiously illustrated lecture on " Primitive Man," in which he outlined the results of modern studies of the remains left by the earliest races that inhabited Europe. The development of skill in flint-working was first sketched, the limited knowledge of the physical characteristics of these primitive inhabitants of Europe diffidently touched upon, and then the lecturer passed on to the very wonderful pictorial art of the later Palæolithic Period, of which he showed a beautiful series of coloured slides.

Mr Praeger, the author of "Irish Topographical Botany," followed with a lecture on "Irish Wild Flowers," in which he dealt with the geographical distribution of a number of interesting plants. Ireland affords many examples of curiously anomalous distribution, which no doubt have their explanation in the geographical revolutions of the past. Many of these were dealt with by the lecturer, who referred more particularly at the close of the lecture to the peculiar assemblage known to botanists as the Lusitanian flora of south-western Ireland, from their occurrence also in Portugal, the Lusitania of the ancients. He pointed out how this implies the former exposture of a large area of the now submerged margin of Europe, known as the Atlantic Shelf, and indicates that there once existed a continuous coast line from Ireland, via Spain, probably as far as the Azores.

In the afternoon the Committee of the Association entertained to lunch in the Zoological Gardens the members and those who had been so good as to give their services in lecturing and demonstrating during the meeting. The members of the Summer School took the opportunity of passing a vote of thanks to the Hon. Secretary, Mrs Wright. A beautiful piece of embroidery was presented to Mrs Wright, who thanked the members warmly, but disclaimed responsibility, as apart from the Committee, for any success which may have attended the first session of the Summer School.

Professor Cole, the President of the Association, then thanked all those who had assisted in the work of the School, and declared the session closed. The members were afterwards conducted round the Gardens by the Hon. Secretary, Professor Francis Dixon, and had many interesting features pointed out to them.

A Sketch-Map Geography. By E. G. R. Taylor. Pp. 147, 6¾in. x 8½in. 5/-. Methuen.

This is a new idea in geography books, and a new idea will always meet with consideration in the geographical world, but it is a good idea, and for that we welcome it. It consists of a large number of sketch maps, 160 of them, but it is not an atlas; in fact, the author insists on the book being used in conjunction with a good atlas. Each sketch map is the result of careful selection of material, with an elimination of the less relevant facts, and by ingenious draughtsmanship, an emphasis of those facts which really count. Considerable ingenuity has been displayed, and there are very few cases where there is the slightest possibility of erroneous ideas being originated. In addition to the sketch maps there are short, pointed notes, which, like all work with which Miss Taylor has been associated, bear the stamp of accuracy and painstaking selection. No part of the globe has been neglected, and a reasonable balance has been struck. The sketches are neither over-crowded nor incomplete, and they are excellently printed. None is beyond the powers of the average secondary school pupil to reproduce, and those teachers that fear a mere memorising of the sketch may rest assured that no pupil could satisfactorily reproduce the drawings without gaining valuable and definite data on geographical matters. A general and careful use of the book should do much to eradicate such faults as vagueness, inaccuracy, loose reasoning, and careless generalization, which are the sources of criticism by so many examiners. W.E.W.

Philips' Pictorial Pocket Atlas of the World. viii. + 132 + 48 pp., 6in. x 4in.

This is an ordinary little set of maps with political colouring for the most part, but a set of rough relief maps are put in as an introduction, and with this are some small views. The maps give reasonably up-to-date boundaries, though in certain spots it would have been better to indicate how dubious the lines marked actually are.

Notes on the Map of Architectural Distributions in France.

PREPARED BY AMY R. BURGESS,
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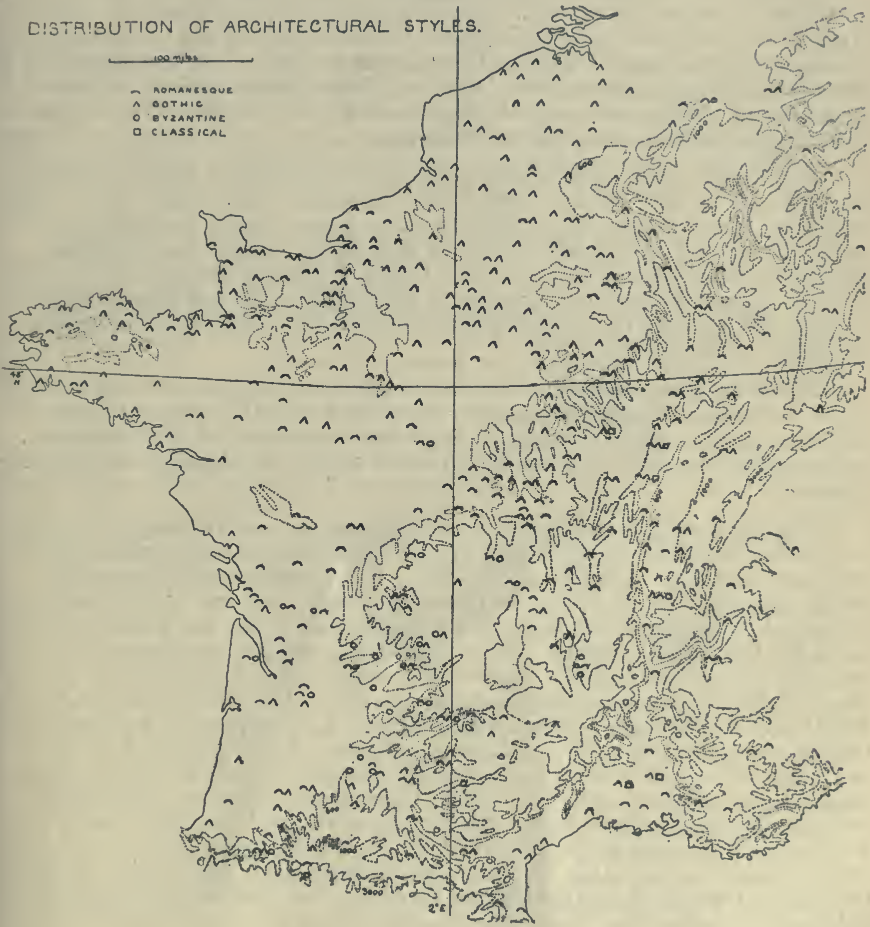

THE map indicates both the fundamental similarities and the regional differences in development of architectural styles in and around France. In compiling it, decisions have had to be taken which are necessarily not above criticism, for some divergence of opinion is always possible as to whether the Romanesque element in a particular Gothic building is or is not worthy of a mark ; but these slight divergences of individual opinion will apply mainly to cases where two styles are marked side by side for the same place.

The first fact to be noted is that the Romanesque style is practically universal as the foundation. The next point might be brought out more vividly if the reader would colour all the marks indicating Gothic. That would show very clearly the great importance of the Gothic style, so called, in the Paris Basin, and especially near its centre. That the style was first developed there is a well-known historic fact. The Romanesque builders, working with stones far smaller than the Romans, whom they followed, had used, found it difficult to make their round arches strong enough unless they were small. In the Gothic system, using the pointed arch, on the other hand, each side of the arch may be said to rest against and press upon the other. Thus greater size, and especially height, became possible, and in its original home the style developed into the high cathedrals, which are the wonder of the world. Chartres, the queen of them all, Reims, Paris, Amiens, all belong to the Basin proper, and only one large one of quite the first-class is away towards the border of the basin at Bourges.

If the reader will mark in some other colour the historic ways out of the Paris Basin, he will see the Gothic style spreading along these ways, into Flanders, where it becomes modified because brick is used for building, to Metz, Strasbourg, and Basle, along the pilgrim way called the Route de S. Jacques to Bordeaux and Bayonne, and thence to Burgos and Léon in Northern France, and through the Carcassonne gap to Narbonne and Montpellier, in both of which places the cathedral gives abundant evidence that the style is not really at home there.

It will be noted, however, that in the more outlying parts of the Paris Basin to the west (Normandy and Brittany) and south (Le Nivernais, etc.), the Romanesque style remained very important in spite of the rise of Gothic,. while on the Rhine the importance of the old style is, artistically, very great indeed.

Classical feeling is appropriately noticeable in the south, though it would be possible to discuss whether the mark for Gothic should not be placed side by side with that for classical style at Albi. It is specially important to notice the occurrence of classical ideas in Upper Burgundy, and one might describe at some length the special Burgundian modifications of the Gothic which seem due to classical feeling. The inclusion of a portico on the west front of so many churches there is an obvious feature of this kind (Church of N. Dame at Dijon, churches at Beaune, Semur, etc.) The occurrence and distribution of the Byzantine styles, with its cupolas and domes, is an interesting but not sufficiently explained feature. It seems that Byzantine influences in art spread far and wide in the centuries following the fall of Rome ; they appear in Scandinavia, and are thence transmitted to Ireland (interlacing ornament on stone pillars) in the 6th century A.D., and they are found in Ravenna and in many parts of North Italy. We do not know as yet how they reached Aquitaine, but the map demonstrates their importance along the west and north sides of the Plateau Central ; the churches of Périgueux, Cahors, and Angoulême are among the most famous French examples of this style.

On the whole the map brings out the contrast between south and north, between the more Roman and the less Roman France, and, if one could push the analysis one stage further and give an extra colour to the fully typical Gothic, one would find the contrast clearer still. Thus in architectural distributions one sees only less clearly than in the distributions of dialect and of legal traditions, the important fact that France is compounded of a southern, more Roman, and a northern, less Roman element, though the Roman heritage is important everywhere in the country, which was long proudly known as the eldest daughter of the church.

Account of Voyage from Southampton to Wellington, N.Z.

By Constance Sparling.

September 30th to November 16th, 1920.

OUR first port of call, Newport News, Virginia, was reached on October 12th. Here only those who had their passports endorsed by the U.S. consul could go ashore, the others, including myself, having to wait three days in port while coaling was going on. Peering at intervals through the canvas with which the decks are screened during this process, one could see the long array of coaling piers, while airships and aeroplanes circled overhead.

Night draws a charmed veil over the low, sandy shore, and the ugly, straight lines of the piers, and hundreds of lights sparkle out of the darkness, while a searchlight plays intermittently.

On October 15th we thankfully turned southward, and during the night of the 18th passed Watling I., but it was too misty to see the first landing place of Columbus. October 15th found us in sight of Jamaica. About 9 a.m. it appeared, low and grey, like a cloud along the horizon, but gradually the forested slopes of the Blue Mountains became distinguishable.

Next day we were able to go ashore in Kingston. There are some wide streets, tree-sheltered, but the outskirts of the town, on the way to Spanish Town, are terribly sordid. The population, to the casual observer, consists almost entirely of negroes. On our way to Spanish Town we passed quite a long procession of men, women, and quite young girls, being taken to the Court House to be tried, chiefly for fighting and stealing.

The road in places was hedged by cactus, and here and there were huge banyan trees and eucalyptus, fields of waving sugar cane and plantations of bananas, also a few bread fruit trees and tamarinds. Outside the wattle and dab huts, thatched with palm leaves, were scantily clothed piccaninnies, who waved their hands and shouted to us. Goats abound, and gentle, tired-looking donkeys ; mules draw light carts, generally covered by an awning, but only two herds of cattle were to be seen in thirteen miles.

In a garden square in Spanish Town plumbago was in full bloom, while gorgeous coloured lizards played round a fountain.

By Saturday afternoon we were anchored off Christobal, waiting to enter the Panama Canal next morning. The length of the canal, from deep water in the Atlantic to deep water in the Pacific, is about fifty miles, and the passage from Christobal to Balboa takes about seven hours. Soon after leaving Christobal, one enters the Gatun Locks, where the ships are raised eighty-five feet, to the level of the Gatun Lake. Each of the three locks is divided into two parallel sections, so that two ships can pass through at the same time. The ships are towed through the locks by electric mules, three on each side. They seem to be almost alive, and remind one of a mixture of a tank and an electric tram. It is wonderful to see them scale the hills by the lock gates, when the ship has been raised by the inflowing water to the level of the next lock.

After the third lock has been passed, the ship enters the Gatun Lake, which has been formed by damming the Chagres and other small rivers. The lake, which is about 150 square miles in area, is surrounded by hills covered with tropical forest, and studded here and there with wooded islands. Wherever the land has slipped so as to expose the soil, it is the most brilliant red, which forms a wonderful contrast with the vivid green of the forest and the blue of the lake and sky. Pelicans fly overhead, and alligators can be seen in the distance.

After twenty-four miles one enters the Culebra Cut ; the banks, for the most part, are overgrown with greenery, but in places there are waterfalls tumbling over the bare, reddish-grey rock. There are dredges always at work here, clearing away the soil that continually slips in from the sides of the cutting.

When the nine miles of the cut have been passed, the ship enters the Pedro Miguel Lock, where it is lowered thirty feet, to the level of a small lake which connects with the Miraflores Lock, where sea level is reached. Round Miraflores Lock there is a fairly large settlement ; some of the buildings are quite imposing, and fountains can be seen playing in the gardens.

From Balboa, where we anchored, we went up by car to Panama—a busy modern city. There is a fine square there, with cool fountains playing, and where there are beautiful specimens of tropical trees and plants, of which palms and Bougainvillea are the most beautiful.

Old Panama, about five miles from the modern city, is almost too wonderful to be described. Crossing over a rickety plank bridge, one can see, a few yards to the right, the ruins of the old stone one built bv the Spanish. The archway is still intact, but the top is overgrown with bushes and creepers. Beyond this is a ruined stone tower, and a little farther on are the ruins of the cathedral.

Close to the shores of the Pacific stands all that is left of the Castle, which must have been very extensive. One great tower, built of limestone and ancient, deep red brick, still rises from a great forest of palm trees and tangled undergrowth. On its inner side is a rounded arch, in perfect preservation, with maidenhair ferns growing in the crannies of the stonework. The only inhabitants now are an army of large ants, which have worn a pathway about four inches wide, and so long that we had not time to trace it to the other end. We met them, each carrying a piece of leaf, like the soldiers in Macbeth, on a very small scale. It was difficult to believe that we were only five miles from a great, modern city, with electric trams and motors everywhere.

Our next and last stop was Pitcairn I., twelve days' journey from Panama. Though only one and a half miles long by one mile broad, this volcanic island rises a thousand feet above the sea. Red and grey cliffs slope steeply to the shore, and beyond these the vegetation is most luxuriant—cocoanut palms, bananas, pawpaws, oranges, limes and lemons all seem to flourish here. The inhabitants are chiefly interesting on account of their curious history, as they are descended from the mutineers of the ship "Bounty." In 1786 an expedition was sent to procure bread fruit plants from Tahiti to cultivate in the West Indies. When these had been obtained, the crew mutinied, and set the captain and sixteen of his followers afloat in an open boat, in which, after a journey of over three thousand miles, they eventually reached the shores of Timor. Some of the mutineers, having obtained wives from Tahiti, took refuge at Pitcairn, where their presence was not suspected for many years. Some time during the last century, the island becoming over-populated, the whole community was moved to Norfolk Island, but some of the people found their way back to Pitcairn, where their descendants remain to this day. Directly we anchored, they came on board, bringing necklaces, shells, baskets, fruit and flowers to sell. Their chief requirement seemed to be gramophone needles.

Monday, November 16th, being the day left out of our ship's calendar, we reached Wellington on Tuesday, 16th.

Mineral Oil in Europe and America.

A Summary of our Geographical Knowledge. Kindly communicated through Professor Roxby.

Origin of petroleum, two schools—
- (a) Inorganic origin.
- (b) Organic origin. (Vegetable matter*).

Facts re occurrence of petroleum.
- (a) Its distribution lies mainly in unaltered or little altered strata, principally in folded nitre zones of tertiary age.
- (b) Synclines less favourable to accumulation than anticlines.
- (c) Two kinds of deposits :—(1) Ancient stores containing fixed amounts ; (2) deposits which are being fed continually.
- (d) Influence of physical conditions, i.e., favourable strata for storage is gritty and porous, and overlaid by impermeable rock.
- (e) Tendency of petroleum to upward displacement, therefore age cannot be determined from the rock yielding it.
- (f) Gypsum and rock salt frequently found in close connection.

1.—*EUROPE AND MIDDLE EAST.—REGIONAL.*

A.—Galicia. Extension :—200 miles N.W.—S.E. along northern Carpathian flanks (width, 40—60 miles). Oil bearing rocks : Neocomian, Eocene (richest), Oligocene, and Miocene. Chief district, Bovyslaw—Tustanowill, 70 miles S.W. of Lemberg. Large quantities of ozokerite—a solid residuum of petroleum also mined.

Bukowina—almost unworked—links A with

B.—Roumania. Extension Galicia to Iron Gate (400 miles). Exploited region lies in flanks of Transylvanian Alps and Carpathians, between Jalomita R. and Trotush R. Chief centres Prahova, Dumbovitza, Bacau, and Buzeu. Oil bearing rocks principally Miocene and Pliocene, but also Eocene and Oligocene. Mountain system continued on through Balkans—no oil to Crimea. Indications here, also in the Kuban basin and along northern slopes of Caucasus to

C.—Grozni, in the Terek basin, second only to Baku of Russian fields. An anticline of clayey yellowish schists. Oil bearing rocks : Oligocene and Miocene. Chief centre, Braguni field, 17 miles N.E. of Grozni.

D.—Baku, comprising 8 fields in the Apscheron Peninsula (including Holy Island). Oil bearing rocks : Miocene, Oligocene, and Pliocene. Continued (submarine) across the Caspian to the district south of Krasnovodsk-Merv line, also through the Nurgan Steppe and Urumiya to

Mesopotamia and Persia. A belt running S.E. following Zagros Mts. from 100 miles N. of Baghdad to the Persian Gulf. Chief oil bearing rock, Miocene. Finds signalled at Kerkook and Kifri. Kasr-i-Shirin in Kermanshah an important centre. Chief centre of Anglo-Persian Company between Shuster on the Karun R. and Romez, 83 miles to S.E., also the Maidan-i-Napthun field 50 miles N.E. of Ahwaz on same river. System continued through mid-world mountain belt via Baluchistan to Upper Burma.

2.—*EUROPE, &c.—ECONOMIC SECTION.*

A.—Galicia. Greater output expected in future by deeper drilling and further exploitation of abandoned shafts. Post-war position—suffering from destruction, therefore shortage of fixed plant—political alterations. Poland to obtain 600,000 tons per annum. Formation of French companies to assist Franco-Polish agreement for importation of oil to France via Danzig.

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* The accepted theory.

B.—Roumania. Great lack of transport holding up export and home distribution, also of fixed plant to replace war damage. Only 50 per cent. of output available for world markets because of large home consumption. Roumania striving to become an industrial state. Area under exploitation 35,000 acres; 300,000 acres yet untouched. Pipe line from Bacau to Constanza conveys 50 truckloads a day (refined). Daily output at present, 250—300 truckloads (10 ton).

Output—	August, 1920.	July, 1920.	June, 1920.
	98,615 tons.	81,405 tons.	79,957 tons.

Foreign Trade.	Pet. Prods.	Ref. Pet.	Petrol.	Crude Oil.
Jan.—June, 1920	12,825 (tons)	49,571	24,594	3,834
Jan.—June	110 tons	4,874	4,655	52
July, 1920	3,050 (tons)	24,995	5,476	3,014

The Anglo-French Agreement (San Remo, April, 1920), France and Britain to assist each other in obtaining oil concessions in Roumania. Setana Romana Company taken over from Germany, Roumanian interest 51 per cent., France and Britain 24½ per cent. each.

C.—Baku. Decrease of output pre-war owing to mismanagement of Russian Government. Output 1901, 11.5 million tons; in 1914—8, 5 million tons. Present transport conditions: pipe line from Baku to Batum (560 miles) and Transcaucasian Railway with 6,000 ton capacity. Russian market gone because of poverty there. Baku must attempt to capture some of the European markets. For this another pipe line, and a large fleet of oil tankers to ply between Batum and the Mediterranean ports. Italian Government and Italian financiers ready to support such undertakings. All nearer markets the monopoly of Anglo-Persian Company.

D.—Mesopotamia and Persia. Anglo-French Agreement (San Remo, April, 1920). Mutual interests provided for in Mesopotamia. France to receive 25 per cent. of output obtained by Britain. Native Government to participate if it desires, on a basis of one-fifth. A special clause binds Britain to support the French in obtaining oil from the Anglo-Persia Oil Company to be piped from Persia through French mandated territory (an agreement signed a month ago between a French combine and the A.-P. Company partially fulfills this—a company is being floated in France with a capital of £4,000,000 to develop the importation of oil from Persia to France. The A.-P. Company retains a 45 per cent. interest. French oil tankers are to convey the oil to Porto in N.W. France, and Tunis, Algeria, and French Senegal, where oil tanks are now actually being constructed, i.e., Dunkerque, Havre, Rouen, St. Nazaire, St. Palisse, Bordeaux, Oran, Algiers, Bizerta, and Dakar). In return France is to give every facility for the construction of two pipe lines if desired, and the railways necessary, for the transportation of oil from Persia to a port or ports on the Eastern Mediterranean, through spheres of French influence, and also for the establishment of wharves and depots free of charges at these termini.

CENTRAL AND SOUTH AMERICA.—REGIONAL.

A.—*Three Mexican Fields.* Oil occurs in Upper Cretaceous and Tertiary beds; igneous intrusions affecting accumulation of oil.

(a) Northern Field. Richest. Fifty miles long, and extending inland 40 miles to foothills of Sierra Madre. Field divided into three districts of production. (1) Elbano, in N.—district round Tampico—heavy oils. (2) Panuco—N.W.—adjoining Elbano district and centreing round Upper Panuco River. Most active development here. Chief towns, Panuco, Puerto Lobos, Topila. (3) Tuxpam—S.—with extension towards Vera Cruz. Chief town Furbero. (1914 production, 24.5 million barrels).

(b) Isthmus of Tehuantepec. Lighter oils. Export by Ninantitban to Atlantic and Salina Cruz to Pacific. (1914 production, 0.33 million barrels.

(c) Tobasco-Chiapas. Lighter oils.. Chief town, San Christobal. (1914 production, 1.1 million barrels.)

B.—*West Indies Fields.* Oil occurs in direct continuation through Cuba (asphalte), Hayti, Porto Rico, Barbados.

C.—*Western and Northern Flanks of Andes.*

(a) Colombia. In Cretaceous and Tertiary beds. (1) Caribbean field, extending from Magdalena mouth to Gulf of Urabo. (2) Pacific field—narrow coastal strip, 60—70 miles long, extends from Baudo to Buenaventura. (3) Magdalena-Santander field—plateau deposits, very little developed.

(b) Ecuador. In Eocene sandstones and shales. Only region of promise is St. Elena field, 64 miles W. of Guayaquil.

(c) Peru. Most productive state in S. America. Oil in Eocene. (1) Northern field—richest—Zorritos, Lobitos and Negritos Districts. Chief towns, Talara, Tumbez, Payta. (2) Central field. Indications near Ica, but not worked to any extent. Callao the outlet. (3) Plateau field. Deposits round L. Titicaca in Puno and Pusi districts. Mollendo the port.

(d) Chile. Slight indications of oil (1) near Straits of Magellan. (2) near Tarapaca, (schists).

D.—*Eastern and Southern Flanks of Andes.*

(a) Trinidad. Occurrence in Miocene in S. half of island—pitch lake—asphaltic deposits.

(b) Venezuela. Occurrence in Miocene (1) round Gulf of Paria—Perdonales and Bermudez pitch lakes—probable connection with Trinidad deposits. (2) L. Maracaibo—rich asphaltic deposits in State of Zulia.

(c) Bolivia. Very little oil—strip from Santa Cruz to N.W. Argentine favourable.

(d) Argentine. Comparatively rich heavy oil in Upper Triassic, Jurassic and Cretaceous beds. (1) Salta Jujuy field—S. extension of Bolivian petroliferous area. (2) Lenque field —asphalt. (3) Cachenta field—asphalt (Rhaetic beds). (4) Comodoro Rivadavia—in Chubut territory—by far richest region.

E.—*On Edges of Highlands of S. America.*

(a) Dutch Guiana. Oil seepages reported.

(b) Brazil. (1) Oil-bearing Cretaceous shales from Amazon mouth to Bahia—belt 50 miles wide. S. Brazil—band of black shales from San Paulo to Uruguay.

AMERICA.—ECONOMIC SECTION.

A.—Mexico. 1920 (estimated) production 135.00 million barrels. Possible production estimated at 547.00 million barrels, but full development held back by (1) lack of transport for both oil and materials—lack of steamers for export. (2) Lack of sufficient storage. (3) Disorganised political conditions. Great yield of Mexican wells compared with N. American. Appalachian (oldest) 100,000 wells yielding an average of two-thirds barrel daily. Rockies (newest), 400 wells yielding an average of 40 gals. daily; Mexico 250, yielding 1,000 gals. daily. Zone of possible production estimated at 230,000 square miles, of which only 8,000 square miles are being developed.

Relations between America and Mexico.—U.S.A. contributes two-thirds world's supply to-day, but already 40 per cent. producing fields exhausted, and in 20—25 years present fields will cease to yield, so U.S.A., consuming more than she produces, looks to Mexico with surplus oil and a good geographical position for future supply. Great preponderance of American interests in Mexico—1918 production: American interests produced 73 per cent, British 21 per cent., Dutch 4 per cent., Spanish and Mexican 2 per cent.

Transport Conditions. (a) Elbano—Oil too viscous for use of pipe line —use of tank cars—export by Tampico, which has 90 per cent. shipments. (b) Panuco—oil barged down Panuco River to Tampico—also pipe line communication between Panuco, Topila, and Tampico. (c) Tuxpam—exports oil of Furbero district—ships load one mile from shore by system of flexible pipes—much oil exported without treatment.

Mexican fields at present private owned; need of foreign capital and lenient taxation; suggested foundation of national petroleum bank to aid companies.

B.—WEST INDIES. Oil here of no commercial value at present—possibilities of drilling through coral capping of Barbadoes.

2.—*SOUTH AMERICA.*

Petroleum production at present not very flourishing, but according to some, possibility that S. America will become second in world production.

1. *Labour conditions.* Until population is more dense any great development of mining cannot be looked for.
2. *Self centred feeling of States* which fail to realise importance of a Federal Geological Association to prevent unnecessary failures —need of federation from economic standpoint.
3. *Lack of Capital.* Investment in agriculture appeals to people rather than in mineral ventures—importance to-day of foreign capitalists, N. American, British, German, French, and Belgian. Need for establishment of sound credit systems.
4. *Lack of adequate transport facilities.* Petroleum industry bound up with railways. Rapidly increasing use of oil as fuel. Need of railway development to establish plant and to simplify export.

CHIEF STATES.

(a) *Trinidad.* 1919 production 2.60 million barrels oil; 160,000 tons asphalt. Heavy oil—possibility of extensive use as fuel oil by British navy.

(b) *Venezuela.* Rich in oil, but little development until 1910 on account of (1) political conditions, (2) dense jungle, lack of railways, roads, and even tracks, (3) no good port; Maracaibo harbour sand locked. Eastern Venezuela exports asphalt from Bermudez Pitch Lake. 1918, 43,000 tons. Western Venezuela —Oil of more importance commercially (two British companies, one American). 1918, .35 million barrels. Refineries at San Lorenzo and Curacao.

(c) *Peru.* Rapidly increasing production. 1919—2.875 million barrels, of which N. districts, Negritos, Lobitos, Zorritos, produce 88 per cent.

Use of Oil.—(1) *Railways.* S. Peruvian Railway uses Negritos oil; imports by Mollendo; storage also built at Puno and Cuzco for smaller consumers. (2)*Coast steamers*—load at Tabara and Callao. (3) *Nitrate fields*—N. Chile. (4) *Diesel Engines* for pumping in irrigation.

Economic result of War.—Conversion of all W. coast industries from coal burning to oil burning. Coal prices up through shipping famine, also difficulties of unloading coal as compared with oil. Possibilities of oil in Eastern Peru—suggested export via Madeira-Mamore railway and Amazon to Para.

(a) *Argentine.* Of increasing importance. Comodoro Rivadavia fields richest, but until very recent years use of S. Wales coal (freight 10/- per ton), cheaper than use of oil and Diesel engine. War conditions have hampered import of plant from N. America, also strike disturbances. 1918 production—1.400 million barrels. Export of oil to Buenos Ayres and distribution from there. Preponderance of British interests here—Falklands as prospective customers.

Salta Jujuy. Proposed motor traffic between Salta and Antofagasta, which will open up both oil region and N. Chile.

Mendoza. Use of oil by Argentine Great Western Railway.

WORLD'S MARKETED PRODUCTION OF CRUDE PETROLEUM PER MILLION BARRELS (42 GALLONS).

Year	Roumania (1857)	U S A. (1859)	Italy (1860)	Canada (1862)	Russia (1863)	Galacia (1874)	†Japan (1875)	Germany (1880)	India (1889)
1910	9.724	209.557	.05	.316	70.336	12.673	1.931	1.03	6.138
1913	13.555	248.416	.048	.228	62.834	7.818	1.94	1.0	7.93
1914	12.827	265.762	.39	.215	67.021	(a) 5.033	2.74	1.0	6.19
1917	2.689	335.315	.5	.205	70.00	5.965	2.9	no data	6.73
1918	8.498	350.131	no data	25.4	49.5	6.5	3.5	no data	5.9
1919	6.440	377.719	no data	no data	46.8	5.8	3.7	no data	5.7

Year	Dutch East Indies (1895)	Peru (1896)	Mexico (1904)	Trinidad (1908)	Egypt (1911)	Persia (1917)	Others	Total for each year.
1910	11.031	1.33	3.333	.142	—	—	(a) 1.5	329.091
1913	11.97	2.133	25.902	.503	.095		(a) 1.3	385.70
1914	(b) 12.705	1.917	21.188	.643	.777		(a) 1.2	399.608
1917	(b) 12.93	2.533	55.293	1.6	1.939	(a) 1.5	(a) 1.0	501.099
1918	(b) 14.2	2.82	71.00	1.9	3.650	(a) 7.2	(a) 1.8	526.863
1919	(b) 18.3	2.875	92.00	2.6	3.340	(a) 7.0	(a) 2.5	574.774

† Including Formosa. (a) Estimated. (b) Includes British Borneo.

Report on the VIIIth Italian Geographic Congress.

THE eight hundred and fifty congressists assembled in the Great Hall of the Institute of Superior Studies in Florence on the morning of Tuesday, 29th March, and proceeded to the 12th Century Hall of the Old Palace (Palazzo Vecchio).

Here Dr. Antonio Micheli, Secretary for Agriculture, solemnly opened the conference in the presence of Cardinal Mistrangelo, Archbishop of Florence, the Lord Mayor (Prof. Garbasso), and the Aldermen of that ancient city.

Among the many distinguished persons present at the Congress were the Under-Secretary of Fine Arts, Sig. H. E. Roscali, Senator Filipo Torrigiani (President of the Senate), Generals Count Pecori, Giraldi, Porro, Ferrero, and De Marchi ; Admiral Lotetti-Bodini, representing the Admiralty ; Grand Officer Olivieri ; General Vaccheli, Director of the Military Institute of Geography ; Professors Marinelli and Erino, secretaries of the Congress ; Col. Carlo Rausch, Geog. Institute of Prague ; Commendatore Fuortes, representing the President of the Court of Appeal ; Commendatore Marinani, Director of Post and Telegraphic Service ; The President of the Deputazione Provinciale, Sebastiano Del Buono ; Signor Massini, President of the Naval League ; Admiral Trianci ; Comandante Roncagli, Secretary of the Royal Italian Geographical Society ; Professor Palazzo, Director of the Royal Office of Meteorology and Geodynamics ; Professors from the Universities of Rome, Milan, Turin, Bologna, Pavia, and Naples ; the Royal Commercial Institutes of Superior Studies of Naples and Turin ; and Prof. Jaia, of the Naval Academy of Leghorn.

The great number of the congressists and the variety of interests represented testifies to the keenness in the subject which the Congress has aroused.

There were five sections of Congress :—

1. SCIENTIFIC SECTION.—Mathematical Geography ; Physical and Anthropo-geography.
2. HISTORICAL SECTION.—History of Geography and Cartography ; Historical Geography ; Study of Place Names.
3. DIDACTICAL SECTION.—Method of Teaching Geography ; The Spreading of Culture and Geographical Knowledge.
4. ECONOMIC GEOGRAPHY.—Commercial Geography ; Emigration Problems ; Territorial and Ethnological Statistics.
5. COLONIAL GEOGRAPHY.—The Exploration and Geography of Italian Colonies.

Sectional discussions took place daily during the Congress from nine a.m. till noon.

The afternoons were spent in visits to museums and places of geographical interest in the city.

In the evenings from six to seven cinematograph and lantern exhibitions were given, primarily to demonstrate the use of such apparatus in spreading geographical culture.

All members of Congress met from nine p.m. till ten p.m. for lectures of general geographical interest.

The last days of the conference were devoted to excursions. A tour was made in automobiles, visiting S. Gimignano, Volterra, and the hot springs of Larderello. Members were conducted over the plant used for abstracting the borax salts.

During the week of Congress, receptions were given to the congressists by the Leonardo Da Vinci Club, the Borghesi Club, and by the British Institute.

Exhibitions of maps and apparatus occupied the great halls of the Studi Superori of Florence throughout the Congress week.

There was something essentially appropriate in the meeting of the Congress in Florence—the birthplace of such men as Paolo Dal Pozzo, Toscanelli, and Amerigo Vespucci.

In 1867 the Royal Italian Geographical Society was born in Florence; later the Italian Military Institute was opened in Florence and flourished exceedingly under the guidance of Ferrero with his great technical knowledge.

The first 'Geographical Review' was published in Florence, its aim being to aid explorers and teachers of geography and to help to complete the culture of young men who were entering the consular service or who for other reasons would travel widely.

A great deal of very useful work was carried out by the various sections of the Congress, the details of whose programmes will be sent to any interested on application to the Geographical Department of the University of Bristol.

Florence,
29th March, 1921.

To the President, Vice-Presidents, and Members of the VIIIth Congress of Italian Geographers assembling in Florence, 1921.

I bring you greetings from the British Isles from the members of the Geographical Association.

We are keenly appreciative of the work of Italian geographers in many directions, nor are we unmindful of the greatness of the spirit of your wonderful country, which is even now being displayed in so many ways.

The past few years found our countries working in the closest co-operation for the welfare of mankind.

In these days, when each country is faced with its own peculiar problems of reconstruction, we work in harmonious concord still. Long may such feeling exist! We would that some other countries might work as hard for the rehabilitation of Europe as Italy has done and is even doing to-day.

If even a portion of our hopes of success for your conference are realised, it will be successful indeed.

In conclusion, let me express my personal thanks for the kindness which has been bestowed upon me on all hands. I bear back to my country memories of a very happy time among you.

W. W. Jervis, Capt.

Florence,
1st April, 1921.

Copy of a letter from General Vacchelli, Director of the Military Institute of Geography and President of the VIIIth National Congress of Italian Geographers.

Dear Captain Jervis,—

I have the pleasure to acknowledge the very kind and cordial message which you have brought to the Committee and members of the VIIIth National Congress of Geography from the Geographical Association of England. The message is particularly welcome and gratifying to us, coming from a country possessing such glorious traditions in the science of geography and which has always led the way in every branch of research concerning the study of the earth and all connected subjects.

I now desire to ask you to convey to the Association our gratitude particularly for the warm appreciation expressed in the message of Italian initiative and efficiency in the various fields of modern activity.

I assure you that we entirely reciprocate the feeling which you expressed of the need for co-operation and harmonised work between friendly nations ; a need which was never so stringent as in the present crisis for recuperation after heavy losses entailed by the war. The field of scientific research is particularly adapted for active co-operation ; and the work and effort of the different countries can easily be organised to a unity of aim and harmony of results by which the entire community of nations would profit.

This co-operation would foster indirectly the mutual understanding and facilitate the undertaking of even more fundamental links between nations.

With kindest regards, believe me,
Yours sincerely,
N. VACCHELLI.

The New World. ISAIAH BOWMAN. World Book Company, New York, 1921. 632 pp.

General Maps of Africa, 29in. x 26in., **Central and South Africa,** 36in. x 30in., and **South America,** 33in. x 24in. Messrs. Bartholomew, Geographical Institute, Edinburgh. 1921. 2/6 each on paper or 5/- on cloth.

These maps, the rough size of which is given in each case, are politically coloured, and give the facts of this type up to date. They are maps for fairly close examination, and will be found useful for many general purposes of reference. The name of the firm indicates that the work has been carefully done. A striking point incidentally brought out by the use of a special colour for "African States" is that Abyssinia and Liberia are held to be the only parts of Africa not in the power of European States, and of one of these a good deal might be said.

A. WHEATON & CO., LTD., EXETER.

Just Published. WHEATON'S SUGGESTIVE GEOGRAPHY

The New Europe. 1/6.

By C. B. THURSTON, B.Sc., F.R.G.S., and S. BURTON, B.A.

The events of the past seven years have wrought such great changes in the political Geography of Europe that a new text book dealing with the Continent becomes essential.

In this book all the changes that have been made to the time of going to press have been noted *and separate chapters have been devoted to the newly formed states.*

The first three chapters of the book deal with the Continent as a whole, showing the inter-relation of physical features, climate and vegetation and their effects upon the life of the people in various parts.

In the treatment of the separate countries special stress has been laid upon the way in which the life of the people has been affected by physical and climatic factors and considerable attention has been given to the location and growth of the larger towns.

Head Teachers are invited to send for specimens. *Write for our new Educational List.*

A School Geographical Society.

By Rev. J. I. Miller, B.A., Ampleforth College, Malton.

THE profitable direction of a boy's recreation time is a problem which must frequently confront the mind of every schoolmaster. The development of school societies provides one method of partially solving this difficulty, and an attempt is here made to give an account of the formation and work of one such society. The intrinsic interest and comprehensive content of modern geography combine in recommending that subject as a suitable one for playing a part in the solution of this problem. This is especially gratifying to geography teachers, as it enables them almost clandestinely to cover much ground for which class-time is insufficient, and which would have to be wholly neglected unless it could thus find a place.

Some four years ago, whilst several societies were in process of formation, the geography master was approached by a deputation of his pupils who wished to start a Geographical Society—undoubtedly the youthful geographer was unwilling to be outstripped by his historical or astronomical confrère. A business meeting was soon held and a beginning made. A secretary was elected, and two other boys chosen to serve with the secretary and the chairman, who was the master, on the committee, in whose hands the arrangement of meetings was left. Forty boys put down their names for admission, and these were mainly drawn from the middle school, from boys who were preparing for the Lower Certificate Examination. The numbers have since increased to sixty—this limit is placed by the capacity of the room available for meetings—and the Society now consists of boys from the upper and middle forms, several of the original members still, after four years, attending the meetings regularly.

The Society meets every fortnight, and lectures illustrated by lantern slides are the normal fare provided. Early in the term the secretary receives the names of boys who volunteer to lecture, and after this the committee arrange the programme for the term. Good judgment and some foresight on the part of the officials are urgently necessary at this point, if the session is to prove a success. The choice of subjects and lectures must receive careful attention. Quite roughly, Regional Studies (e.g., Canada or Egypt) are more suitable for the younger boys ; physiographical or economic questions (e.g., Vulcanism or the Cotton Problem) for older boys, whilst some master is often called in to address the first meeting of term, and as he is often not essentially a geographer, some ' border-line ' topic may on this occasion be chosen (e.g., Weather Forecasting, Strategic Geography, or Imperialism). We are constantly being reminded of our duty to impart clear ideas on the League of Nations. A lecture by a master on this question would very suitably open a new session. Finally, provided a boy has a definite gift for lecturing—in my limited experience I have met several—a most interesting evening can be made out of the journeys of an explorer, Columbus or Vasco da Gama, Livingstone or Stanley, Peary or Scott. I add the titles of the lectures which formed our sessions last winter :—

India.
Some South Polar Expeditions.
Rubber.
Glaciers.
Irrigation.
Weather Forecasting.
Tropical British Possessions in East Africa.
Umbria.
The Journeys of H. M. Stanley.

India and Weather Forecasting were dealt with by masters at the opening meeting of the September and January terms respectively; to get a master to take the first lecture has the advantage of providing three available weeks for the boy who lectures at the second meeting. The South Polar Expeditions and the Journeys of Stanley were fluent lectures by boys who found talking a comparatively simple matter! The paper on Umbria was given by a Sixth Form boy, who formerly spent eighteen months in that portion of Italy, and the lantern slides were made from photographs which he had himself taken. Providence was ranged on our side when the Irrigation paper was being prepared. An Old Boy who had recently been engineering in Mesopotamia came to pay us a visit, and he naturally was able to give much help to the boy who was working at this subject.

My experience suggests that an average boy is well able to compose an interesting paper without much individual help. Direct his reading, provide him with the necessary books, and he will turn out a paper which the audience will be the better for hearing. To me it seems very important that the boy should work the subject out from the raw material thus provided; herein lies a great part of the educative value of the system.

Older boys can often lecture; younger boys must be content as a rule to read a written paper. If the reading is slow and distinct, and if a good and proper use is made of the slides, the loss is not too great, and the younger boys ought in common fairness to be given a chance. True lecturing, however, is distinctly preferable whenever this is possible, if only on account of the fact that it is more conducive to a good understanding of the subject by the audience.

A further type of meeting is sometimes held—a question meeting. Some few days beforehand the secretary posts on the notice board a number of general geographical questions, and these are debated and discussed when next the Society comes together. The boys are encouraged to discover the correct answers from text-books, encyclopædias, etc., before the meeting. The following samples may be given:—If imports pay for exports, and if England has for many years imported far more than she has exported, why is this country not bankrupt? Explain the sterility of many limestone regions. Why is the Dead Sea much more saline than the Caspian? The small volumes by A. E. Jenkins, M.A. (Aids to Geography Studies) contain a wealth of suitable questions of this kind, and boys are always interested and ingenious in ventilating their ideas about such matters.

Summarily then it may be said that this Society is of value to the boy-lecturers in so far as they thus gain experience in facing an audience and in getting a thorough and detailed knowledge of some parts of the content of geography. The boys who are listening are benefited both by the stimulus which the lantern lectures certainly give to their work and also by the knowledge they directly acquire by attending to an illustrated treatment of a broad question: new ideas are given, new avenues of thought are opened up.

Finally, let me state that after some four years no loss of interest on the part of the people concerned has been noticed. At the beginning of each term the boys are always ready to start again, and volunteers always come forward in sufficient numbers to make it possible to carry on the work.

Study of Geological Maps. Dr. GERTRUDE ELLES. Camb. Univ. Press. 74 pp., 7 plates, map, 64 figs. 12/-. 1921.

This most interesting work, with its rich collection of good illustrations, will be much valued by geographical teachers interested in the geological and structural side of their work. There is a good chapter on the uses of topographical maps in geology, and naturally Snowdon gets special attention. Topography and Outcrop is another subject that is very ably treated, and disposes of many difficulties that worry the teacher. The illustrations of block models are a great feature of this book, which will be a valued companion for any student who wants to see the relation between the geological and the orographical map. We are very grateful that so distinguished a specialist as Dr. Gertrude Elles should have undertaken the work, and so have helped many teachers and students from a store of original knowledge.

Educational Excursion to the Yorkshire Coast.

Mr W. A. Kay, head master of Haxby Road Mixed Council School, sends us an account of the third expedition of the school to the village of Cloughton, six miles north of Scarborough, on the coast. As the school is situated in the plain, the change to a scene which included miles of high cliffs of varying composition, jutting out in great headlands with numerous wykes between, and involving a railway climb of a gradient of 1 in 39, was of much educational value. Walks on the moors, fossil hunting at Robin Hood's Bay, hunting for flora not to be found in their own region, recording on maps the finds and the position of earthworks, pit dwellings, burial mounds and stone monuments, formed part of the numerous activities of the youngsters. Mr Kay felt that, as camp life involves much "roughing," of which the children get more than their share in an ordinary way, a Guest House where life could be conducted in an orderly, decorous and tasteful way was desirable. He was fortunate enough to secure the use of one which had a beautiful old world garden, and found that the effect of the life on his mixed party of boys and girls was most beneficial. A feature of his time-table, which compares very favourably with other summer outing time-tables, was a long free period for the children after breakfast and before the organised routine of the day.

The Use of Pilot Balloons in Secondary Schools.

L. Cundall, M.Sc.

THOUGH it is extremely doubtful whether it is advisable to attempt pilot balloon work except in an advanced course of geography, there is no doubt that where it is attempted the pupils gain a more thorough insight into the mechanism of atmospheric circulation, and especially cloud formation, than they can possibly do by reading.

It is possible that in those schools where there is close correlation between mathematics, physics, and geography, the following description of pilot balloon work may be of some value to those pioneers who wish to make the investigation of the lower atmosphere part of advanced work in practical geography.

Materials.—A theodolite, either a handwork model or a pilot balloon theodolite, a balloon, and a supply of hydrogen are the only essentials. Most schools have model theodolites with which balloons can be observed to a height of several thousand feet. Toy balloons can be used, but in that case preliminary tests should be carried out to ascertain the average rate of ascent in some unheated high-roofed hall.

The British Oxygen Company, Shrubbery Works, Lower Walsall Street, Wolverhampton, were able to supply hydrogen at 5s. per 100 cubic feet in 1920, and it was possible to purchase pilot balloon theodolites from the surplus war stock of the Meteorological Office for between £60 and £70 in 1919, when the Director was able to allow schools to purchase with a promise of the refunding of the purchase price if the theodolites were returned in good condition.

The balloons generally used are the 90 inch Meteorological Office pilot balloons, which are the most suitable for obtaining a rate of ascent of 500 feet per minute, and it is best to obtain from the same source a filler and balloon balance, though the latter can quite easily be made in the manual workshop.

METHOD OF CONDUCTING A PILOT BALLOON ASCENT.—In single theodolite work it is assumed (sometimes quite wrongly) that the rate of ascent is constant. It is only constant when vertical currents of air are absent, and on these occasions the rate of ascent is calculated from an empirical formula determined by Hesselberg, Cave, J. H. Dines, and others from experiments with balloons liberated and timed in a large hall such as the Albert Hall.

If L be the free lift—i.e., the weight the inflated balloon will support in addition to the weight of the rubber and attachments—and W is the weight of the balloon and attachments, the total weight the balloon will support is $W \times L$.

The experiments have shown that the lifting velocity $\text{L.V.} = \dfrac{q\sqrt{L}}{\sqrt[3]{W + L}}$ metres per minute, where $q = 83$: when feet per minute are used, $q = 276$.

The following tables have been compiled to enable observers to obtain a lifting velocity of 500 feet per minute.

TABLE 1. When the balloon is sent up alone.

	Weight of balloon and attachments and gram weights.							
	68	70	72	74	76	78	80	82
Weight of balloon and attachments.	Velocity of Free Lift.							
31	491	496	500	503	507	510	514	517
32	—	494	498	501	505	508	512	515
33	—	—	494	500	504	507	510	514
34	—	—	—	498	502	506	509	512
35	—	—	—	—	500	504	508	511
36	—	—	—	—	—	503	506	510
37	—	—	—	—	—	—	505	508

TABLE 2. When required to carry lantern and candle of 13 grams weight during night ascents.

	Weight of rubber, attachments, and free lift.								
	88	90	92	94	96	98	100	102	104
Weight of balloon.	Lifting Velocity.								
31	486	490	493	497	500	504	507	510	513
32	—	488	492	496	499	502	506	509	512
33	—	—	490	494	498	501	504	507	511
34	—	—	—	493	496	500	503	506	510
35	—	—	—	—	495	498	502	505	508
36	—	—	—	—	—	497	501	504	507
37	—	—	—	—	—	—	500	503	506

(Weight of balloon and attachments, and of free lift in grams.

Lifting velocities in feet per minute. Value of $q = 276$).

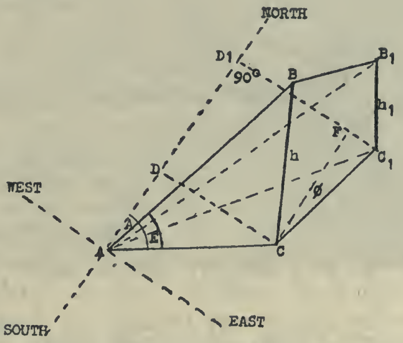
To find V = velocity of wind and $\phi =$ its directions; after the balloon has been weighed and filled and the lifting velocity determined, it is released, and its elevation and azimuth (from north) are read at the end of each minute by means of the theodolite.

If t is the time in minutes; A° the azimuth from north; E° the angle of elevation; h the assumed height ($=$L.V.$\times$ t); horizontal distance travelled $=$ h cot E; D_{we} is the horizontal distance travelled towards the east; $D_{sn.}$ is the horizontal distance travelled towards the north; the *resultant* horizontal velocity makes an angle ϕ with north.

$$\phi \text{ is found from the equation } \tan\phi = \frac{Vel_{we}}{Vel_{sn}}$$

$$\text{Then V is found from the equation } V = \frac{Vel_{we}}{\sin\phi} = \frac{Vel_{sn}}{\cos\phi}$$

Diagram illustrating the computation of wind speeds and directions from pilot balloon observations :



Proof :—The balloon is released from A, and is at B at the end of the first minute and at B_1 at the end of the second minute.

$$\begin{aligned} \text{Then } BC &= h, \\ AC &= h \cot E, \\ ADC &= 90^{\circ} \\ \text{Therefore } D_{sn} &= AD = AC \cos A = h \cot E. \cos A \\ \text{and } D_{we} &= DC = AC \sin A = h. \cot E. \sin A \end{aligned}$$

Consider the second and successive minutes. At the end of the *second* minute

$$C_1 D_1 = D_{we} \text{ whilst } AD_1 = D_{sn}$$

The displacements during the second minute are represented by FC_1 and DD_1

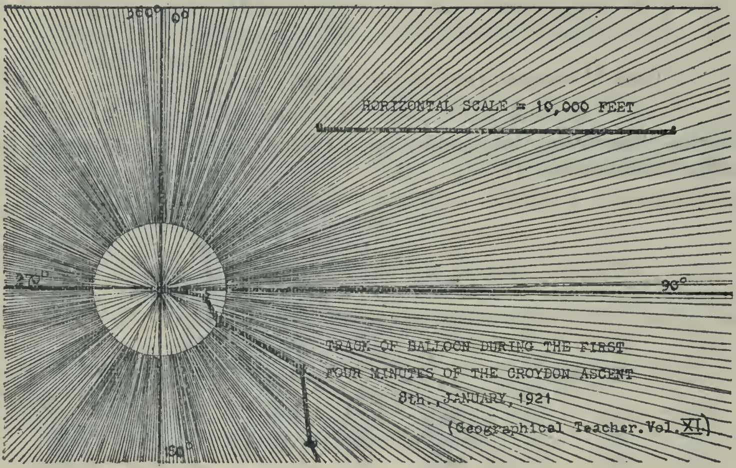
$$\text{Hence } \tan\phi = \frac{FC_1}{FC} = \frac{FC_1}{DD_1} = \frac{Vel_{we}}{Vel_{sn}}$$

$$\text{while } V = \frac{Vel_{sn}}{\cos\phi}. \quad \text{Similarly with successive minutes.}$$

V is the velocity of the wind and ϕ its directions, and may be computed with the aid of logarithms or slide rule.

A much simpler method is by plotting the azimuth readings on radial charts, using the fact that, if the rate of ascent is constant, the horizontal distance from A = h cot E. Thus the horizontal distance from the place where the balloon is released is calculated for each reading of the elevation, and the track of the balloon is plotted to scale. A large drawing board is used and the direction for each minute obtained by means of a rolling ruler.

Diagram of radial chart with the plotting of a single theodolite ascent.


360°
0°
HORIZONTAL SCALE = 10,000 FEET
270°
90°
TRACK OF BALLOON DURING THE FIRST
FOUR MINUTES OF THE CROYDON ASCENT
8th., JANUARY, 1921
(Geographical Teacher. Vol. XI.)
180°

The single theodolite ascents may be used for enabling students to examine the structure of the lower atmospheric layers, and combined with airmeter observations on the ground may be used to explain various particulars of human geography, such as the influence of winds on rainfall and vegetation, the influence of woodlands in reducing the force of the wind and thus protecting plant life from excessive transpiration, the influence of towns as shelters from the wind, the approximate height of the various cloud types at different seasons. It is possible to make comparisons between different continents. Thus a careful comparison of more than 1,000 observations taken in 1918 revealed that the average height of low clouds decreased from 5,000 feet in May to 1,500 feet in November, while a comparison with results obtained at Blue Hill Observatory, Harvard University, revealed the fact that such clouds as Cumulus occurred at a lower level (5,800 feet in May, 3,200 feet in November) in Essex than at Blue Hill (summer 4,800 feet, winter 4,400 feet) during winter.

There can be but few schools in Britain which have as yet developed their advanced geography sufficiently to benefit by much experimental work in the lower atmospheric layers, though where such work is attempted it is probable that double theodolite ascents will also be undertaken.

The computation of double theodolite ascents belongs to the advanced work in mathematics ; the explanation of the mechanism of the upper atmosphere belongs to the advanced course in physics, but the value to geography is that it is possible to find by experiment what are the causes of precipitation. Thus recent experimental work has shown that heap clouds —cumulus and cumulo-nimbus—are invariably accompanied by strong up currents with compensating down currents of drier air, while the examination of temperature lapse rates by Captain Douglas, R.A.F., and others has shown the intimate relation of the temperature lapse rates with vertical currents and cloud formation. Moreover, observations of the vertical currents of air in oceanic equatorial regions and the critical examination of climatological data have thrown much light on the old question of the prevailing wind circulation of the globe, and it seems quite probable that within a short time climatological theory may be based on something more definite than observations of raingauges and thermometers and the unscientific speculations of those who during the past half century have constructed diagrams of wind circulation without sufficient experimental evdence in their support.

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(a) **Preparatory Atlas of the World**. 16 pp. 9d. (b) **Junior Atlas of the World**. 32 pp. 1s. 6d. Each 7½in. x 9½in. Foyle, London.

(a) Maps produced by Bacon and containing political details only. The modern boundaries have been overprinted on old plates, and there is some little contradiction between pages 1 and 2 and elsewhere. The absence of any orographical maps is a blemish, and the weakness is well illustrated on page 11 (N. America), where the only indication of high land is by means of triangles with numbers attached. This may lead to a knowledge of isolated peaks and an ignorance of the real material of geographical importance at this stage. (b) Bacon's political maps only; even the railway map of the British Isles contains no orographical features, though some of the other maps have occasional hachures to show presence of high land. The world map on page 2 is sadly out of date, but all the other boundaries have been revised and many new plates have been employed. Thirty-three inset maps and a gazetteer of 5,000 names make this a cheap production, but the overcrowding and the general difficulty of recognition of those main features required for junior school work will tell against its general adoption.

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GEOGRAPHY.

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Reviews.

Prehistory. M. C. Burkitt. Camb. Univ. Press, 1921. 438 pp., 47 plates. 35/-.

Students of mankind should welcome heartily this workmanlike exposition of the views of the French school of archæologists on the early story of man in Europe. The author is a Cambridge man, who has also studied under Breuil, and the learned Abbé contributes an interesting preface showing us how intimate have been the relations between himself and his British pupil. The book is built up with very numerous tables of reference that make it invaluable to the reader who finds it hard to keep abreast of all the newer technical terms used so freely in current discussions. Those who have been accustomed to follow Déchelette will find the book specially valuable, because that author's first volume, though published ony in 1908, is already out of date, but Burkitt makes no attempt to supersede the later volumes of Déchelette, which remain our best guides to the early ages of metal. Burkitt's views on British finds will arouse considerable interest, and it is valuable to have Breiul's admission of the truth of Moir's view about the existence of man in Red Crag times in East Anglia; the case for " Eolith " is thus to some extent established. The Chellean period is claimed to follow the Riss Glaciation, while the chalky boulder clay is said to belong to the Würm Ice Age.

The Aurignacean period, following the Würm Ice Age, is said to have seen an early spread from N. Africa into Europe (Caspian), and the spread was renewed in late Aurignacean times, and reached then fairly far east. The Solutrean period, on the other hand, would have witnessed a westward spread along the Loess and the cold Magdalenian, the so-called Bühl Ice Age, an extension of northern culture southward, but not far enough to touch the Mediterranean, in which region the Aurignacean is supposed to be effectively continued into the Azilian period, the transition to the Neolithic. At this period there is evidence of the spread of broad-headed men along the flanks of the mountain axis of Europe, still the home of the broad-headed " Alpine Race." The author specialises on the art of the upper Palæolithic period, and his numerous illustrations are a most valuable feature. Periods subsequent to the Azilian are lightly treated, and the critical reader will realise how much we need a serious reconsideration of all the evidence and surmises about the Neolithic stage of civilization.

The weak points of the book are its very poor section on physical anthropology and its undue neglect of the work and views of the Italian anthropologists. But it concentrates an immense amount into its 438 pages, and is of unique value for purposes of reference and for its survey of the work done in recent years, as well as for its moderation and sanity.

The New Stone Age in Northern Europe. J. M. Tyler. Pp. xviii. + 310. London: G. Bell and Sons, 1921. 15/- net.

The title suggests the advent of a very much needed book, for few things are more necessary to the student of mankind than a study of man in his varied environments in prehistoric times, but after the Ice Age was out of the way for good.

Unfortunately, though this book is dedicated to Déchelette, and obviously looks back to that epoch-maker, there is every indication that the author is by no means as deeply steeped in the subject as the synthesiser should be. There is little reference to all the multifarious work that has appeared since Déchelette, and on the other hand there is much carrying over of old philological and mythological speculation into an era to which it has little relation. We know now that without further evidence we are not ready for views about the original home of the supposed Aryan language or about the character of supposed early Aryan religion. We must be content to build up bit by bit through tracing of migrations one behind another, in the hope that some day the link between archæology and language may be made.

The above criticisms are not intended to deny that there is much that is of interest in the book, only that the reader must beware of accepting the contents of this book without great reserve and without correction by study of a large number of recent papers.

Messrs. Batsford have sent us copies of two valuable volumes by M. and C. H. B. Quennell entitled " History of Everyday Things in England," and issued in 1919 at 8/6 per volume.

The authors have contrived to give accounts with considerable scientific seriousness, and yet a simplicity making them interesting to school children, of the developmental changes of the things we use day by day. The first volume takes us from the Conquest to the fifteenth century; the second continues the story to the dawn of the nineteenth century.

The volumes have a chapter for each century, and tell us of the features and plans of ships, castles, towns, monasteries, houses, food, costume, games, ornaments, fairs and markets, laws and so on. The last chapter includes a good deal about social life, and also deals with development of industrial power. The books are richly illustrated, and while the specialist may be tempted to carp at details here and there, the general standard of the work is surprisingly good and reveals the authors as genuine lovers of the arts and crafts, as well as sympathetic students of human evolution. All who are interested in teaching the meaning of the accessories of family and social life in our country in present and past will find this work a valuable addition to their personal as well as to their class library. The illustrations are numerous, well done, and usually most suggestive.

The Times Atlas. The Times Co. suggests that it is an effort to cut out German atlases, but we think Bartholomew's look upon it in a more excellent way as an effort to produce the very best work they can. The German, French, and Italian atlases all have most interesting and valued features, but we think that the geographers of those countries will agree with us as to the primacy of this work of Bartholomew's, and would join with us in an expression of deep regret that Dr. J. G. Bartholomew did not live to see it completed, safe as the matter is in the hands of his son.

The layer colouring which is the firm's speciality is used throughout the atlas, save in a few maps made for special purposes, and the student will revel in the fine maps of many regions of Asia, for example, of which only very inadequate maps were formerly available. The maps of Persia and of Further India have specially struck the writer in this way.

The atlas is issued on the loose-leaf system, which we welcome most cordially, because it gives us the chance of keeping the atlas up to date. If a map has to be superseded because of discoveries or political or other changes, a new one can be inserted with the old one, and the atlas is thereby not only kept up to date, but also made into a singularly accurate record of discoveries and political changes. We hope all such maps will be individually dated, and that every serious student of geography will do his utmost to buy or to procure for an institution near him a copy of the original atlas. It need not be elaborated that the atlas with the original collection of maps complete, and also all the additions made as the years go by, will be a most valuable property both scientifically and financially, a matter quite different from the old atlas, which lost value in a year or two because it got out of date.

In this atlas the general showing of political frontiers by a line on an orographical map marks a great advance in thought on the old idea of a map coloured politically; the new scheme gives the student the thought of the fleeting human arrangement in its far more permanent setting.

For the further improvement of this great work we would suggest a few small points. The term ethnographic map of Europe is not suitable for a map that is purely linguistic, and we think our map makers might give us bigger language maps, not only of Europe as a whole, but also of the Balkans, and so on, on the lines of the fine maps issued by the Istituto Agostini of Novara, Italy. There is also room for consultation with the Royal Anthropological Institute and Section H of the British Association about anthropological maps of Europe.

But what is most needed of all is an improved map of what we may legitimately infer to have been the natural vegetation covering of Europe before the process of forest clearing began towards the end of the Bronze Age. We feel sure that the exhibition and discussion of efforts towards such maps of Europe, of France and of Britain at a few successive meetings of the British Association would give most valuable results in many directions, besides adding an interest to the work of Section E and opportunities for a joint effort, perhaps a committee, between Sections E and H. One of the greatest facts about our European environment is that it is an altered environment, and without an appreciation of these alterations our appreciation of man's relations to the physical facts of Europe is necessarily very incomplete. The belt of loess and related deposits stretching westwards from S. Russia has its influence on vegetation, for trees do not easily grow in loess, and it is of the utmost consequence in following the movements of man and of civilization, but we possess no map of it comparable with that which we owe to the philosophic insight of Vidal de la Blache (see his book on France).

In the map of England and Wales there is need for revision of the naming of physical features in Wales. No one with local knowledge would speak of the "Plain of Cardigan," and the name Mynydd Bach really belongs to a small coast range and not to the line of greater hills stretching south from Plynlymon; these have different names in different parts.

A fresh vegetation map of India is badly needed, and could be of great use in interpreting the facts of civilization, and, in general, we may urge the importance of adding to the atlas these vegetational maps if geographers, botanists, historians, and anthropologists can be induced to co-operate to produce them. They are among our most urgent needs.

Twenty Years of Balkan Tangle. M. EDITH DURHAM. G. Allen and Unwin, 1920. 296 pp.

Miss Durham here gives us her personal experience of Balkan politics based upon unique knowledge and coloured no doubt by pro-Albanian feelings, for which the geographer will not blame her. Her politics are not our concern, but we note with interest that she uncompromisingly accuses the Serb politicians of the Serajevo murders, and more than suggests the plotting of the European War by the Slavophiles for years before its outbreak. As a glimpse into a land of curious survival the book will be read with interest by students, who will find in it a good deal of material for thought. Many books tell us of the number of Muslim Slavs among the Bosniak leader-classes, and some suggest that in that remote region the Turk compromised with the native nobility who kept their lands at the price of acceptance of Islam. Miss Durham, however, tells us that Manichæans were settled by an Emperor in 969 in the Balkan valleys, and spread their Bogumil doctrines at the expense of Christianity. These doctrines included abhorrence of images, and by this means Bosnia especially became divided from the Slav world. At the Muslim conquest the acceptance of Islam was easier for them than would have been the acceptance of Catholicism.

The Swedish Nation. LUNDBORG and RUNDSTROM. Tullberg, Ltd. Stockholm, 1921. 128 pp., 12in. by 9in. 20 plates and numerous other illustrations.

This sumptuous volume kindly lent us by the Eugenics Education Society should be known to teachers who are interested in the anthropological side of their subject. Its illustrated studies of race-types in Sweden are interesting, though not carried into sufficient detail to mark an advance in knowledge. Nordic, Lapp, Finn, and Walloon types are shown, the latter having emigrated from the Low Countries in the 16th and 17th centuries. An interesting chapter on emigration is written with historic perspective, and suggests that periodic recurrence of successions of seasons with uncertain harvests goaded the people to emigrate, even though at the time there might still be much forest land to clear. The writer accepts the view that climate has varied in the past, and for a study of this variation and its causes we may direct the student to a recent paper by Mr C. E. P. Brooks in the Quarterly Journal of the Royal Meteorological Society, in which bibliography is given for a great deal more on the subject than has found place in this Swedish book. The chapter on Swedish national character is poorly done, and might well have been replaced by monographic studies of social groups on the lines of Sir Leslie Mackenzie's great report on the condition of Mothers and Children in Scotland. We hope that teachers of geography will make efforts to see that fine publication of the Carnegie Trust, and will be fired to carry out analogous studies in their own districts. The Swedish book is published in connection with the foundation of a Race Biological Institute, an effort for eugenics based on biological study.

Human Geography. J. BRUNHES. Translated by T. C. le Compte and edited by I. Bowman and R. E. Dodge. 648 pp., 77 maps and diagrams and 146 half tones. Rand McNally, New York, 1920. 5 dollars. Also obtainable from Messrs Harrap, Ltd., London, price not fixed.

This English translation of Prof, Brunhes' famous book is extremely welcome, and students who possess the French edition will find it interesting to have this variant as well, because it contains alternative and additional matter inserted with the author's consent to make the book of more direct value to American readers. The original book stands as a landmark in the progress of geographical thought for more than one reason. It gave us a fresh outlook and fresh methods of analysis, while at the same time according full value to older established viewpoints, and the methods were applied thoughtfully and moderately to a wide range of phenomena, everywhere with the insight of an eminent teacher. M. Brunhes is far too wise to imagine that hard and fast laws are applicable with precision in the study of man and the earth; he claims rather to show relations of connection, and treats them with a finely developed spirit of finesse. By using and developing his methods we may in time go far beyond his conclusions, but his work will surely stand as a beacon pointing the way.

He builds up his argument on three groups of fundamental facts—those of unproductive occupation of the soil, those of plant and animal conquest by man, and those of destructive exploitation. He then proceeds to most fascinating studies of small natural units like oases and areas among the high mountains, and in these sections will be found endless suggestion for any student trying to understand his own district, while his study of facts of destructive exploitation includes an almost equally monographic survey of the life of the Fang.

His chapter on developments of thought from the above fundamentals and their application in Regional, Social, and Historical Geography is naturally of the greatest importance. This edition has an index of subjects, one of places and one of authors cited. Brunhes is a book that no serious geographer should omit to buy and to treasure.

Human Geography. J. RUSSELL SMITH.
Book I. Peoples and Countries. 374 pp. 500 illust., many coloured.
Book 2. Regions and Trade. 450 pp. 600 illust., many coloured.
The J. C. Winston Company, Winston Buildings, Philadelphia.

These interesting American books for elementary schools illustrate the trend of thought among many geographers in America who are making man and his work the centre of their study, and may very likely be advancing towards a new educational discipline, in which the old boundary lines between subjects will be much altered and, often, obliterated. Dr. Russell Smith is well known as an able educationist who can put things in an interesting and vital fashion and is not afraid to use his imagination. Some of the principles on which he claims to work are that Reason should be used to help memory, that abstract ideas should be introduced by means of narratives concretely, that citizenship may be promoted by descriptive work on other lands and their problems, that physical geography can be illuminated by being taught through the study of the life and industries of peoples, and that comparison and contrast are essential throughout. In other words, Dr. Smith departs very far from the standard sequence of treatment of physical structure, climate, vegetation, animals, population, industries, and his work may thus not suit every teacher, but of its value as an experiment there can be no doubt at all. He is always intent on showing how a region influences the life of its people, and may need supplementing in place by facts of the influence of man's work on the characteristics of a region. But this and other minor reservations are of small account, and we can strongly commend the effort to teachers if they will always remember the extreme subtlety of the questions involved.

Teaching of Geography. R. E. DODGE and C. B. KIRCHWEY. About 1 dollar. Rand McNally, New York.

South America. A Geography Reader. I. BOWMAN. About 1½ dols.
Asia. A Geography Reader. E. HUNTINGTON. About 1½ dollars.

The geographical movement in America is being mightily strengthened by these school books published under the ægis of the highest authorities.

The Americans are agreed with us in emphasising the study, at an early stage, of home geography and the simpler elements of the world as a whole. They think one should argue from consequences to causes in the earlier and from causes to consequences in the later work. In their thoughts on the relations of geography to other subjects they are closely akin to ourselves. "Asia" begins with a description of some scenes in Asia Minor as a land too dry in summer, and goes on to a study of China on similar lines as a land too wet in summer, and this is followed by short notes on other contrasts. It is characteristic that everywhere the life and work of the people is the main thread, while the study of physical correlatives is made incidental. Probably a study of this book would be a useful preparation for the more systematised work of the older school of teachers.

Dr. Bowman opens his book on South America with a discussion of the conquerors of the New World, and then proceeds in a fashion parallel to that adopted by Prof. Huntington. His map of the vegetation of South America shows several adjustments as compared with the maps that have been in use by teachers.

The books of this series could be widely used on this side the Atlantic, and we hope that they may be made easily available in Britain. H.J.F.

The Rainfall of the British Isles. BY M. DE CARLE S. SALTER. Pp. 295, 5in. x 7½in. 8/6. University of London Press.

Many teachers of geography have hitherto felt the need for a useful reference book which had collected within its covers the very varied aspects of such a topic as the rainfall of the British Isles. The annual volume entitled "British Rainfall" caters for a rather special type of reader. It is largely statistical, though, for many years now, important articles have been written with reference to the distribution of rainfall, in time and place, of the British Isles. The present Director of the British Rainfall Organisation has now collected together the main contents of such articles, together with others, from a variety of sources, and has published them in the form of a fairly complete study of the whole question. References to original sources are quoted, so that summaries can be extended should the reader wish to pursue the subject further. The whole has been so well written that the book as it stands makes interesting reading, and the treatment is not too technical. The following are the chief topics:—Physical processes of rain formation, gauges, mapping of data, incidence and frequency of daily rainfall, types of distribution, seasonal rainfall and fluctuations, relation of rainfall to configuration, and economic application of rainfall data. There are 126 illustrations, and many of these have been specially drawn for this book. The maps, notwithstanding heavy reduction, are quite distinct, but we regret the plan of marking "heaviest" rainfall by the same convention as that used for "lightest" rainfall. The use of an open stipple for the first tint would allow of heaviest rainfall always finishing as solid black. Fig. 48 would also be improved by the consistent use or consistent omission of the decimal point, but these are small matters. The book deserves a wide public.

W.E.W.

A South African Geography. E. H. L. Schwarz. xii. † 262 pp. Blackie and Son. 1921. 7/6.

This book is an attempt to survey the fundamentals of general geography, and then in the latter half to apply the ideas thus enumerated to a survey of Africa region by region. The first part proceeds on orthodox lines, tracing astronomical relations and then discussing maps and their making, following this by peeps into geomorphology, meteorology, animal and plant distributions, race study, and the study of the distributions of minerals. In many of these sections Prof. Schwarz' knowledge of science is a help to completeness of a kind, however difficult it may be to deal satisfactorily with the big questions touched in the limited space provided. Many points of interest are mentioned and trains of thought are started.

The treatment of the regions shows many signs of the geologist's interest, and the folder map of Cape Colony is a brave attempt to give a vivid idea of the relief of that region, even if it is not altogether successful. Naturally, South Africa gets far more detailed treatment than the rest of the Continent.

School Wall Map of Europe. G. W. Bacon and Co. 1921. 30in. x 40in., 7/6 mounted. 5ft. x 4ft., 21/- mounted.

This map attempts to give the present political arrangements of the continent in striking colours, which, however unattractive, do show up under artificial light. The boundaries shown do not indicate how doubtful matters are in several cases. Vilna is put into Lithuania without reserve, and Upper Silesia is shown as German, while the Albanian borders are treated as settled, and the Treaty of Sevres is followed for the Græco-Turkish region. Palestine is shown as an annexe of Egypt. For all this there is something to be said so far as a wall map is concerned, but it would have enhanced the map's value greatly had doubtful matters been better indicated as such. One might criticise the selection of type and other details, but the map is very cheap.

Map Projections. By A. R. Hinks. Pp. 158, 5¼in. x 8½in. 12/6. Cambridge University Press.

The first edition of this authoritative well-known manual appeared in 1912; the present, second, edition is dated 1921. In general appearance and order of items and chapters the new edition closely resembles the 1912 volume, but the additional 34 pages contain very important material. The corrections and additions to the first edition form a new Chapter XI., while Chapter XII. deals with projections for large scale topographic maps, and Mr Hinks has used the opportunity to modify his first edition remarks regarding orthomorphism. Chapter XIII. contains some notes on the history of map projections of such great interest that it is to be regretted that it is short. One would have liked the inclusion of at least all the names mentioned in the earlier part of the book, e.g., Aitoff, Breusing, Euler, La Hire, Nicolosi, Mollweide, etc., notwithstanding that their work may have been of less value than that of others. Chapter XIV. gives additional tables, chiefly for an extension of the principle of the International map, but on a 1 in 2 million scale, and for a Lambert's conical orthomorphic of Asia on a 1 in 5 million scale. The necessity for having Mr Hinks' book on the reference shelves has been mentioned previously. Teachers are now advised to obtain the second edition of this most useful book.

W.E.W.

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Obituary.

The Rt. Hon. Viscount Bryce,

O.M., P.C., D.C.L., LL.D., F.R.S.

IT is fitting that the Association should offer its tribute to the memory of its Honorary Vice-President, the late Right Hon. Viscount Bryce, O.M., famous for so many years as scholar, statesman, and explorer. He gave a high example of the services of the geographer to public life, thinking of the problems of men in all parts of the world, studying them at first hand, and endeavouring to find solutions uncoloured by racial, national, or imperial prejudice. He was not afraid to argue matters out to their conclusions, to criticise sharply, but usually also constructively, and to defend his views against all opposition. There were few parts of the world he had not visited, and his contributions to the growth of understanding of England in America and America in England, give him an honoured place in world history. It is not so generally known that his expert understanding of Armenia was developed through explorations of Mount Ararat and its surroundings. His courage in thought, speech and action remained with him to the end, and many teachers who think of current problems will have studied his last book on " Democracy " with astonished admiration at its vigour. His services to geography and to this Association were many, and the Association begs leave to subscribe this small tribute of gratitude and admiration.

THE

GEOGRAPHICAL TEACHER.

SPRING, 1922.

Annual Report, 1921.

THE membership roll stands at 4,159. The numbers for previous years grade up from 996 to 1917 to 3,965 in 1920. This year has been one of serious difficulty to several branches because of restricted communications during the coal strike and also, in the case of some branches outside Great Britain, because of vagaries of exchanges. It has been practically through the gifts of members of the Association that the situation has been saved during this difficult year, and for this generous help the officers are most grateful. The fact that our total membership so successfully withstood losses of members under these heads is due to the hard work of Miss Fleming, ably supported by many Branch Secretaries, whose work is beyond all praise, and has its reward in the growing impression on public opinion which the geographical point of view is making. Many new branches have been started during the year, including several in London districts, as well as branches or affiliated associations in the Isle of Man, Canada, West Africa, and various local centres in Ceylon. In spite of grave difficulties, the Irish Geographical Association has had a most successful year ; a report of its summer school is given in the Autumn, 1921, number of the Geographical Teacher. The address on " The Clearing " given to that summer school by Prof. G. A. J. Cole, F.R.S., was published in the Journal of Education and School World for October, 1921. Among many interesting activities of the branches we may mention that several are organising regional surveys and collections of maps to be kept at the local libraries ; this is work which must become most valuable as it develops. Maps showing real distribution of population, traffic statistics, health data, and so on, would greatly help to convince public authorities of the value of geographical studies, and would thus promote the more adequate recognition of the subject. They would also furnish data that will be enormously valuable a century hence.

The Leeds Branch, with the co-operation of the Yorkshire Branches, has produced an interesting first-draft list of novels and literary works of geographical interest under the editorship of Miss D. Wharton. The Northampton Branch gave us a valuable discussion of the " Scheme for a First Course in Geography," previously prepared by the Hampshire Branch. Similar discussions of the List of Novels, to be followed by the sending of lists of addenda, would be valuable. Among schemes prepared by branches and published in the magazine we are glad to notice that for Ceylon (Miss Loos), that for Carnarvonshire (Miss O. M. Rees), and that for Lancashire (Prof. Roxby).

A large number of school excursions and tours have been arranged by branches, and there is a growing movement towards forming school geographical societies ; we should be glad to receive reports from schools in which these exist. A new development of the activities of the Association is the formation of a Touring Committee to give advice and assistance and instruction to members in the organisation of tours at home and abroad.

Our special thanks are due to the members of the Hampshire Branch and to the authorities of the University College, Southampton, for their most hospitable welcome to the Association at the Spring Meetings of the Council. The collection of maps kindly exhibited by Colonel Dudley Mills aroused special interest.

The growing public interest in geography is attested by many signs in America, where a translation and adaptation of Brunhes' well-known Human Geography has been made. Prof. W. H. Barker has contributed to the Journal of Geography (Vol. 20, No. 8, Nov., 1921) an account of Geography in the schools of Great Britain, while Sir J. Scott Keltie wrote a report on the " Position of Geography in British Universities," published by the American Geographical Society through the Oxford University Press. Mr Fairgrieve spent the summer semester at Chicago University lecturing on Geography and exchanging notes and ideas with colleagues there. This valuable work, we regret to understand, has affected Mr Fairgrieve's health. We hope he will soon recover his accustomed health ; the Association feels his absence very severely. Sir H. J. Mackinder spoke to the North of England Education Conference in 1921, pleaded the cause of geography in education at an important meeting of the Royal Geographical Society, and has recently spoken to similar purpose in Manchester with interesting results. The Hon. Secretary was asked to discuss the geographical point of view in a Citizens' Lecture at the British Association Meetings at Edinburgh, 1921. Mr W. W. Jervis, B.Sc. (Lecturer in Geography, Bristol University), represented the Association at the Italian Geographical Congress, 1921. It is a pleasure to record the election of Mr H. J. E. Peake, chairman of our Regional Survey Committee, as President of Section H of the British Association, and of Dr. M. I. Newbigin, a member of the Association, whose fame is everywhere, as President of Section E. Prof. Roxby has been engaged on important work in China during this year, making investigations to assist educational institutions there to adjust themselves to the new policy of public education projected by the Chinese Government.

The Association renews its expression of thanks to Dr. H. R. Mill for his Herbertson Memorial Lecture on " The Value of Regional Geography," and to the Royal Geographical Society for their courteous provision of accommodation.

The occasional publications of the Association during the year include the First List of Novels, already mentioned, and a small pamphlet to help teachers interested in studying local antiquities geographically. A firm of publishers has also undertaken to publish from time to time books based upon theses by members of the Association, and to allow members special terms for the purchase of these books. Miss M. C. Delany's " Historical Geography of the Wealden Iron Industry " has already appeared ; Miss R. M. Fleming's " Ancient Tales from Many Lands " will have appeared ere this report is issued. Other books will follow. The arrangement with the publishers involves no financial obligation or benefit to the Central Office of the Association or to its officers.

As usual, a considerable number of Summer Schools of Geography was held in 1921, and experiments were tried with a view to giving them mobility, so that they may become a means of helping teachers to know different parts of the country by personal knowledge. Demonstration Tours are also being organised by a new Standing Committee of the Association under the chairmanship of Mr E. E. Lupton.

We are glad to congratulate and thank the Syndicate of the Cambridge Local Examinations upon their provision of alternative syllabuses in Geography for the large numbers of school pupils in distant lands who take their qualifying examinations. This represents a most valuable advance. We hope that this and other examination authorities will next proceed to the reconsideration of the position of geography in their higher certificate examinations, in view of the report on that subject issued by the investigators acting for the Board of Education. The Association has continued its negotiations with the Board of Education, and an important conference was held in the spring. The British Association has also taken the matter up, and an important series of letters appears in another part of the magazine. The League of Nations Union has formed a Geographical Sub-Committee, with Dr. J. F. Unstead as chairman, and is studying the same problem. We may hope that the difficulties and restrictions upon serious geographical teaching in the higher forms of secondary schools will thus soon be diminished. It would be of great assistance if teachers in secondary schools would write to the Hon. Secretary before June, 1922, giving a short and clear account of any geographical work done in connection with advanced courses in their schools, and stating the hours per week devoted to such work.

The question of the amount of the annual subscription has been considered, and the following report has been approved at the annual business meeting of 1922 :—

The question of the amount of our annual subscription has been a matter of careful thought during the year, and it is felt that in view of the wide recruitment of members on the present basis, it is desirable to avoid change unless it is inevitable.

(1.) The branches are now quite free to put on an additional local subscription, and they do so in several cases. In addition to this, they get a subsidy of 1s. per member from the Central Office. Unless, therefore, the annual subscription were raised seriously, the majority of the branches would find themselves no better off, and loss of numbers on a serious increase in subscription would mean that they would be worse off.

(2.) We have a large number of members rot able to get to meetings of any branch, and also a number of foreign members, and both these groups should increase very greatly. A rise in the subscription would hinder their growth.

(3.) While the balancing of our accounts is a matter for anxious thought year by year, and our resources do not as yet provide for a proper staff adequate to cope with the work, our financial position is being strengthened, and a rise in the subscription would risk everything. We might easily lose on the balance, and this we cannot afford to do.

(4.) To make the position of geography in education more secure, we are anxious to spread a knowledge of what geography can be among teachers of classics, history, mathematics, modern languages, and science, and wish to have such teachers as members. They cannot be expected to pay a heavy subscription, as they have other associations to support.

NOTE.—Special attention is called to the need for more support for tne Association's Series of Monographs. We appeal to members to buy the " Historical Geography of the Wealden Iron Industry," in order to make a continuation of the series possible.

Annual Balance Sheet.

RECEIPTS FOR 1921.

	£	s.	d.
Subscriptions—Arrears	0	10	0
Current	684	14	6
Advance	201	11	6
Sales	149	19	4
Advertisements	124	1	6
Gifts	87	18	3
Interest on Investments (to meet expenses on behalf of Life Members)	41	18	0
Sale of Cheque	0	4	6
	£1290	17	7

EXPENSES FOR 1921.

	£	s.	d.
Advertising	3	13	0
Annual Meetings	14	3	0
Expenses of Special Committees and Officers..	23	4	3
Salary of Clerk	200	0	0
Salary of Junior Clerk	58	0	0
Postages and Parcels	144	14	6½
Stationery, Office Expenses, Small Disbursements, and General Printing	132	19	8½
Printing of " Geographical Teacher " ...	439	0	8
Subvention to Branches	147	12	0
Addressograph	24	10	2
Insurance	1	1	6
Herbertson Memorial Fund Lecture	20	0	0
Bank Expenses	5	7	6
Deficits from 1920	40	19	0
Balance in hand	35	12	3
	£1290	17	7

CAPITAL ACCOUNT, 1921.

RECEIPTS.

	£	s.	d.
Balance from 1920	88	3	11
Interest	1	4	6
Life Compositions	82	0	0
Transferred from Herbertson Memorial Fund ...	23	17	9
	£195	6	2

EXPENSES.

	£	s.	d.
Investment, January, 1921	85	8	0
Balance, December, 1921	109	18	2
	£195	6	2

Geography and Peace.

RIGHT HON. LORD ROBERT CECIL, K.C., M.P.

PRESIDENTIAL ADDRESS DELIVERED AT BIRKBECK COLLEGE ON JANUARY 5th, 1922.

GEOGRAPHY, when I was young, was of all the subjects of my education the least inspired and the least inspiring. It consisted for the most part of learning by rote a certain number of disconnected facts and statistics which in their isolation were of devastating dulness. The names of the French departments, the chief towns of the English counties, the comparative length of European rivers, the natural products and manufactures of various countries, this was the geographical nourishment of my youth. Fortunately, I assimilated very little of it, and have forgotten almost all the facts of the kind which I once knew.

Nowadays geography is a very different thing. It includes, I suppose, all those aspects of human life which are affected by locality. Certainly the bearing of territorial proximity or the reverse on international relations may be fairly regarded as an integral part of geography, and I therefore make no apology for addressing you this afternoon on the subject of Geography and Peace.

Until we had experience of the Treaty of Versailles, it was popularly supposed that the Treaty of Vienna had reached the high-water mark of human injustice and futility. According to this view the negotiators after the Napoleonic Wars were actuated by blind self-interest, indifferent to everything except securing another lease of power for the tottering despotisms of Europe, and, above all, utterly regardless of the sacred principle of Nationality. When, therefore, President Wilson laid it down that self-determination was to be the keynote of the new settlement, his pronouncement was greeted with loud applause, at any rate in all the Entente countries. What, indeed, could be fairer than that the inhabitants of each country should choose for themselves the sovereignty under which they would prefer to live? For the future there were to be no unredeemed territories, no peoples rightly struggling to be free, and since everyone would be a subject of the country he preferred, one great cause of war would be removed, and all would be for the best in the best of all possible worlds. Unfortunately, the principle of self-determination is easier to enunciate than apply. To begin with, the races of Europe with inexplicable perversity decline to live in water-tight compartments. They are, in fact, hopelessly intermingled. Anyone who has glanced at an ethnological map of, say, Central Europe or the Balkans will realise in a moment that a re-partition of territory which will do complete ethnic justice is a physical impossibility. Nor does such a map present anything like the full complexities of the problem. It does not in the least follow that the political allegiance of a population will be determined entirely by racial considerations. Switzerland is a standing instance to the contrary. The Swiss people consists of three races different in origin, history, and language, and not united in religion. Across the borders on each side of the country are found powerful States inhabited by men racially identical with their Swiss neighbours. Such conditions seem to invite foreign intrigue and internal dissensions. Yet, as a matter of fact, there are few nations more united than the Swiss, and few countries where a genuine and intelligent patriotism is stronger or more universal.

Many observers declare that Burgen-Land or West Hungary—the strip of country which has been transferred by treaty from Hungary to Austria—is another case in point. The majority of the inhabitants are, I believe, German. I say, I believe, for no two ethnological authorities are ever agreed as to the racial character of any district. But assuming that they are German, there seems still considerable reason to doubt whether they would not have preferred to remain the subjects of Hungary.

To solve difficulties of this kind recourse was had in some cases to plebiscites, which again appeared a simple and satisfactory device. And in favourable circumstances it has worked well. In Slesvig, for instance, the great mass of the population in the north were Danes and in the south Germans. It was therefore possible by collecting the votes in zones of territory to divide the provinces between the two countries without exciting grave discontent. But in other districts the issue was not so favourable. In Upper Silesia the result of the voting, taken, as directed by the Treaty, by communes, was baffling in the extreme. The towns generally voted German, and the surrounding country often Polish. Kattowitz and Königshütte, on the extreme east of the territory, and consequently right up against the Polish frontier, were overwhelmingly German. But the district round them was as definitely Polish. To draw a frontier ethnically unassailable passed the wit of man, and the best that could be done was to expatriate an equal number of Poles and Germans—which is a little reminiscent of the man who declared that in his experience of the law justice was done, for the innocent who were convicted were about balanced by the guilty who were acquitted.

So far we have been considering difficulties in the application of the principle of nationality or self-determination to determine the position of the new boundaries in Europe, where that principle has been adopted. In many cases, however, the decisions at Paris were based, in part at least, on other grounds. Sometimes it was said that the wishes of the inhabitants of some territory must be disregarded for strategic reasons. That sounds very well, but in practice it usually means that security of one or two neighbouring States is to be increased at the expense of the other. The Southern Tyrol is taken from the new Austria and given to Italy, so that the 30 or 40 million Italians may not in the future have to fear invasion by the six million Austrians. Or the boundary of Albania is rectified in favour of Serbia, lest the million Albanians may be tempted to overrun the far more powerful Yugoslavian State. Strategic reasons are, generally speaking, only part of the international spoils system. Self-determination may have been ridden too hard at one time, but it is essentially just, and will prove a better foundation for a stable Europe than militarist land-grabbing.

It must, however, be admitted that the expression self-determination is in some ways an unfortunate one. It seems to imply a kind of invitation to every population affected by the war to consider whether or not it would like to change its political nationalty. Our old British maxim that government should be by consent of the governed is sounder. Until active discontent manifests itself there will always be strong arguments for the status quo. A transfer from one sovereignty to another will bring in its train many hardships. Europe is full of them at this moment. The Magyars of Transylvania who have been annexed to Roumania must have suffered much, even if the charges against the Roumanian Government be rejected. The mental outlook, the social, educational, and religious standpoint, above all, the history of the two peoples, are divergent. So it is with the German inhabitants of the territory attached to Czechoslovakia and many others. True, the Magyars and Germans are in each case in a minority. The majority of the population of the annexed territories are doubtless quite content with the change. But it is possible also that they would have been content if they had been left as they were. Called upon to determine their lot, they might have chosen their new rulers. But none the less the old Government might fairly have claimed that its subjects fully consented to its continuance. Where that is so it would have been wiser statesmanship to have let sleeping dogs lie.

All this is perhaps only to say that in applying the principle of self-determination, historical considerations must not be lost sight of. This is certainly true in other ways as well. It may, for instance, be questioned whether the Allies did right at Paris in insisting on the attribution of any part of Silesia to Poland. There were strong arguments on both sides. But personally I doubt if sufficient weight was given to the historical associations connected with the province. We may have our own opinion about the morality of the transaction by which it was acquired by Prussia. But it would be foolish to ignore the kind of sentiment which it awakens in German minds. To them it is the chief trophy of one of their great national heroes. It may have been right on other grounds to over-ride this sentiment. If the dangers to European peace likely to arise from leaving it as it was and those accruing from slighting the German hero-worship of Frederick the Great were carefully weighed, I have nothing more to say. But we who remember the deep indignation roused in this country by the mere proposal to surrender Gibraltar would be blind indeed if we under-rated the strength of national sentiments of this description.

If self-determination as a guide to reconstruction requires modification on historical grounds, it is even more important that those who rely on it should give due weight to economics. Silesia again gives us an example. By the Treaty of Versailles its disposition was to be determined in the first instance by the wishes of its inhabitants, as ascertained by a plebiscite taken by communes. But it was expressly declared that geographical and economic factors should also be considered. Geography here means, I suppose, that the frontier should as far as possible follow well-marked natural features. No question has arisen about that. But the economic features of the problem have caused acute trouble. The district is full of mineral and industrial wealth. Coal, iron, and zinc abound. Factories, coal mines, and railways have followed their discovery. Almost all the development has been by German enterprise and with the German money. To give the industrial portions to Poland would have impoverished Germany and not improbably have sterilised the district for the world at a time when the world can ill-spare any source of wealth. If, on the other hand, Germany were to retain the whole of it, large numbers of Poles would have remained under German sovereignty, against the clear meaning of the Treaty. I have already pointed out that a division of the district on racial lines could only be partially accomplished, and besides, it involved the arbitrary division of industrial property, as, for instance, by leaving the works in Germany and transferring their motive power to Poland, or by separating a town from its water supply. The Council of the League of Nations, to whom the matter was relegated when the Supreme Council found it too difficult to settle, have proposed a novel international device. The political sovereignty of the territory is to be ruled, as far as possible, by the wishes of the voters in the plebiscite. But the economic life is to go on as it was for fifteen years. For all commercial purposes—tariffs, passports, transportation—the frontier is to be ignored, and intercourse is to continue as if no division had taken place.

This proposal, which has been adopted by the Allies, and is now being worked out by a joint Committee of Poles and Germans, is full of interest for the political geographer. If only some device of the kind had been adopted when Austro-Hungary was split up, what a lot of misery might have been spared to the peoples of Central Europe! Now, after years of suicidal barriers between the so-called succession States, an attempt has been made by the agreements of Porto Rosa to mitigate the evil. But much harm has already been done which the Silesian system would have prevented. And the same principle might be extended to cover other cases. Ports belonging to one country which form the natural outlet for another might be subject, as it were, to a commercial condominium. In that way the full commercial use of the Vistula might have been given to Poland, without the rather clumsy device of internationalising Danzig ; Bulgaria might have secured an Ægean harbour at Dedeagatch, and Smyrna might have been left open to Turkey. It might even turn out that when nations found by actual experiment how they could get on without all the xenophobic barbed wire with which they at present guard their frontiers, they might be converted to a more rational system of treating their neighbours.

Self-determination, then, or the consent of the governed, though it is doubtless the basis of territorial re-arrangement which is most likely to secure the stability of Europe, yet cannot be regarded as a complete panacea for all our ills. Indeed, whatever territorial settlement had been made at Paris, if it had been far more faultless than it was, much national heart-burning must have remained. Even if the new boundaries had been admitted to be the best possible, they could not have been satisfactory. Objections unperceived and perhaps unperceivable at the time would have come to light, and as the years went on new objections would have developed. One of the great defects of our international arrangements has been that they were unalterable. A treaty was in most cases in terms eternal. No practical means of revising it existed, so that when its provisions became intolerable, the only plan was to break it, and that was a very bad plan. The negotiators at Paris therefore did wisely in entrusting to the League of Nations a very carefully guarded and tentative power of revision. By Article 19 of the Covenant the Assembly is empowered "to advise the reconsideration of Treaties which have become inapplicable," a power as delicate as it is far-reaching. For though no decision to give the advice indicated could be come to without unanimity, yet it enables any member of the League who regards his treaty obligations as "inapplicable" to have the matter publicly discussed at the Assembly. It is in reference to League functions of this kind that even friendly critics sometimes express doubts whether the present conception of the League is workable. The doubt is put in two ways. Some say that the members of the League are too far apart geographically for them to be able to form an intelligent opinion about matters directly affecting their more distant colleagues. How can a South American State know or care anything about the frontiers between the new Central European States? And conversely, who would trust a judgment by Europe about a dispute between Chile and Bolivia? Even questions of universal importance such as disarmament or health have different aspects in different parts of the world. The existence of a militant State in the Balkans will only faintly move Colombia or Paraguay, and an outbreak of yellow fever in Demerara will scarcely ruffle the equanimity of Esthonia or Bulgaria.

There is undoubted force in these contentions, and they are made more acute by the fact that membership of the League involves some, though relatively a small, pecuniary sacrifice. Yet they must not be pressed too far. The late war is conclusive proof that a sordid quarrel in South East Europe may be the occasion of a catastrophe which will profoundly affect every State in the civilized world. Peace is not only the first of British interests, it is the greatest interest of all other countries as well. Moreover, international co-operation in many matters is and should be world-wide. The traffic in women and children, the unrestricted sale of arms, many questions of economics and transportation, can only be properly dealt with by universal consent ; and having seen the Assembly of the League actually at work, I can think of no nation whose presence thereat could be dispensed with without loss. Still, though this is true and important, it is also undeniable that there are aspects of the League's work which are essentially regional ; and it is a matter for consideration whether more districting of the nations might not advantageously take place. Already there is a tendency to demand that the elective members of the Council should be chosen with a view to give each quarter of the world adequate representation, and that if necessary the Council should be enlarged for that purpose. That seems to me clearly right, and it may well be that it would be desirable to have as well something in the nature of Regional Standing Committees, to which international questions of a local character might in the first place be referred.

But there are other critics who go a great deal further than this. They maintain that the whole idea of the League is faulty. Its constitution is far too rigid, and that causes it to be both dangerous and ineffective. Thus Mr Wells writes in a recent article about the League's " premature explicitness, its thinly theoretical and imitative forms," whatever that may mean, " and its frequent mere camouflage as in the mandatory system." It is of very little moment that these criticisms do not seem very consistent with earlier criticisms which came from the same pen. The important question is, are they sound? I think not.

Let us first see what is the alternative. There again Mr Wells can help us. He prefers a " project of successive conferences, throwing off committees, embodying their results in treaties and standing commissions." That is to say, Mr Wells would abandon all fixed and definite international machinery and all explicit general obligation against war and substitute a system of successive conferences, which would gradually build up by treaties and standing commissions—I suppose to carry the treaties into existence—a system of World Government.

Let me say at once that I have no objection to " successive conferences." As a supporter of the League, no such objection would be open to me. For under the Covenant an annual general conference of some fifty nations is held, which we call the Assembly. It proceeds by—" throws off " in Mr Wells' language—committees, has promoted treaties such as the conventions dealing with the traffic in women and children, and with transportation, and has set up several commissions, such as the Health Organisation and the Economic Committee. Nor is there anything very novel in all this. Those who have read that admirable little book by Mr Leonard Woolf on International Government will have realised to what an extent this side of world organisation has already been developed. If it is desired to supplement these activities by another set of conferences, no one can object. Only I think it will be found that some kind of Secretariat will be necessary in order to give continuity to their deliberations. For without continuity, as the Allies discovered in the war, very little effective work by conferences can be done. If this anticipation should turn out to be correct, it would seem a pity to create a new international secretariat when a very efficient body of the kind already exists at Geneva.

But these are details, practically important, but not touching Mr Wells' main contention. On that two questions arise. Are the proceedings of the League camouflage? Would Mr Wells' plan be better? As to the first, I must directly traverse Mr Wells' assertion. The mandatory system which he takes as his example is a real thing. It is not perfect. But it has secured for a considerable mass of uncivilized humanity a definite standard of good government, to be enforced by the public opinion of the world, acting through an international Mandates Commission. The machinery is actually in operation, and as far as one can see, is likely to work satisfactorily. Quite true, it is at present provisional, owing to diplomatic difficulties with the United States. But these are likely to be overcome, and in any case the Commission is formed, has met, has received reports of the administration of the various mandated territories, and has drawn up its criticisms of these reports, which will in due course be published. Quite true, too, that the system is not yet applied to the ex-Turkish territories. But that is because the Allied Powers have not so far made peace with Turkey, so that no mandates can yet be allotted. Still, allowing for all imperfections and incompleteness, it is surely mere perversity to describe the mandatory system as camouflage. And in other respects the machinery of the League is working with reasonable smoothness and success. I am not aware of a single case where it has broken down.

Even so, it is possible that Mr Wells' plan might be better. He believes that by a " project of successive conferences " establishing scattered pieces of international co-operation, a network of World Government can be gradually built up. But what is to happen to international disputes in the meantime? The League has already had to deal with several, and if it had been stronger, might have dealt with others. Still, it has settled a quarrel between Sweden and Finland ; it has put a stop to fighting between Poland and Lithuania ; it has given a decision, which has been accepted, in the Silesian question ; it has freed Albania from an invasion. In the three last cases the Supreme Council—which acts by " successive conferences " in exactly the manner recommended by Mr Wells—has failed to reach any solution, and it was just the existence of what Mr Wells calls " premature explicitness " in the Covenant that enabled the League to succeed. It is doubtless true that machinery is not the main thing. If the nations wish to go to war, no machinery will stop them. But that is rarely, if ever, the case. What has happened usually in the past is that the great majority of every people desired peace ; a small and energetic minority was for war, and the old international organisation was so chaotic that disputes drifted on until the warlike minority got the nations into a position where peace was impossible. If in 1914 a conference could have been got together, peace might have been preserved. The overwhelming majority of mankind desired it. Even in Germany it is doubtful whether most of the people wanted war. But there was no means of bringing the conference together against the will of the militarists in Central Europe. So, too, quite recently one of the difficulties in the way of the Supreme Council settling the Silesian question was that some of its members refused to agree to a meeting until the dispute had become very nearly hopelessly embittered. On the other hand, the Albanian invasion was stopped with great ease because Great Britain exercised its right under the Covenant to force an immediate meeting of the League Council to consider it, and Yugoslavia, summoned to comply with its obligations under that instrument, did not hesitate loyally to fulfil them. Without the " explicitness " which offends Mr Wells it is difficult to see how this result could have been attained.

One thing, however, should be made clear. No one thinks the League perfect, least of all those who have had most to do with it. When it was first laid before the Paris Conference, the Covenant was only put forward as a first draft, an embryo which might later develop into a full-grown international organisation. On the whole it has worked better than most people expected, and it may even be said that where it has been least successful has been where the spirit of the Covenant has been least faithfully followed. So far as Mr Wells is right in regarding the Washington Conference as a more efficient instrument of peace than the Council of the League, it is because the Council has never been constituted as it ought to be. It was designed to be the authoritative exponent of the views and policies of the States which are represented on it. Unhappily, some of those gentlemen who usually attend it are not in a position to pledge the Governments who send them there. There is a very regrettable tendency to regard the Council as a kind of body of advisory Elder Statesmen, instead of being, as it should be, a meeting of the actual States which compose it. So, too, with the Assembly, though that is more what it was planned to be, still it has never quite realised the conception of a great internatonal gathering of the peoples of the world. Then, again, the absence from the League of Germany, Russia, and the United States is a serious blemish, clearly not intended by the framers of the

Covenant. But these defects and others which might be pointed out are all curable. They call for remedies, not for destruction. Many imperfections might be pointed out in the Washington Conference. Yet you will find no intelligent Leaguer who is therefore tempted to hamper its operations. That would be a very despicable form of international sabotage. We have always desired the assistance of the United States in the cause of peace, and if she finds herself unable or unwilling to give it to us in what we must still think the most effectual form, we are nevertheless ready to welcome it in whatever way it comes. Only we ask others to do likewise. Is it really defensible for any of those who are anxious for peace to slight or hinder serious and honest efforts in that cause? Let them rather come over and help us to the utmost of their power. It is not likely that however many and devoted we may be on the side of Peace, we shall have anything to spare in the conflict with the forces of evil that lies before us.

For myself, though I admire and rejoice at the achievement of Washington, though I recognise to the full the spirit by which that achievement has been possible, I am still convinced that the fundamental conceptions of the League, the fearless appeal to the better side of human nature, the universality of its membership, the international forum in which all nations great and small can meet on equal terms, the definite assertion that mercy and pity, reason and judgment, truth and candour, should be the governing factors in international relations, are splendid in themselves, and that the general lines of the League organisation are not unfit to carry them into effect.

New Educator's Library—Teaching of Geography and Economics. 116 pp., 4in. x 6½in. 2/6. Pitman.

The first part of the Encyclopædia and Dictionary of Education appeared in the spring of 1921, and at the request of many readers the publishers have decided to issue the greater part of the Encyclopædia in sectional form, so that specialists can obtain at a low price those sections which made most appeal to them. The present volume deals with 19 aspects of the two subjects, and is the work of no less than 18 authors, each of whom is admittedly an authority on the topic under consideration, and for that reason, if for no other, it would be unfair to single out any particular chapter for special consideration. There is much that is stimulating in the pages, and the bibliographical references are useful, if not particularly recent, yet, notwithstanding the wealth of talent employed, the book is rather disappointing. This is partly due to some overlapping and repetition, but more particularly on account of the space available for each author, e.g., 1½ very small pages for "A Geography Room," 2½pp. for "Surveying," 3pp. for "Local Geography," 5pp. for "Relations between History and Geography," 4½pp. for "Regional Geography," must result in marked omissions or excessive condensation, and even 8pp. for Astronomy—practically the longest text section—is very short measure. W.E.W.

University College of Wales, Aberystwyth.

SCHOOL OF GEOGRAPHY.

H. J. Fleure, D.Sc., F.S.A., &c., Professor of Geography and Anthropology.
W. E. Whitehouse, M.Sc., Lecturer in Geography
O. H. T. Rishbeth, M.A., Oxon, Assistant Lecturer in Geography

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Full particulars of courses, fees and regulations will be supplied on application to the College Registry.

The Royal Anthropological Institute.

EXTRACT FROM AN ADDRESS BY E. N. FALLAIZE, HON. SEC.

[A summary of a paper prepared by special request of some officers of the Geographical Association for the information of members.]

THE functions which the Royal Anthropological Institute now performs in furthering the study of anthropology may be classified under three heads :—(1) The collection of data relating to man ; (2) The examination, classification, and correlation of these data ; and (3) The publication of the results. Under each of these heads I think that its function is such that when once the nature of the material with which the Institute deals has been realised, it must be conceded that its work is of supreme importance, both to the historian and to the student and teacher of geography.

It is hardly necessary that I should detain you by any detailed description of the organisation of the Institute. Like other learned societies, it conducts its public business by series of meetings, open to all Fellows, at which questions of current interest are discussed, and the results of recent research are described. It has research committees which engage in the conduct of particular investigations. I may mention in this connection the work of the Graig Lwyd Committee, which has excavated the site of a stone axe factory at Penmaenmawr and has brought to light the existence of a considerable industry in neolithic times at this spot, and, incidentally, will probably furnish evidence of importance for early lines of communication and trade routes in this country. Another committee has recently been appointed to explore caves in Derbyshire, while a third, supported in conjunction with the British Association, is dealing with the record of rude stone monuments in this country, a work which, when complete, will have an important bearing upon early culture and race movements in Western Europe. A standing Research Committee has also been appointed recently for round-table discussions of controversial points, and it is hoped that this will be found particularly useful to students.

As regards publications, the Institute publishes a Journal, issued twice yearly, and a monthly periodical, "Man," in which appear communications made to the Institute. The longer and more important of these for the most part appear in the Journal, while "Man" consists of shorter articles, reviews and notices of publications, reports of proceedings of other societies of interest to Fellows, and the like. A feature of great importance to students, for which arrangements are being made, is a series of periodical general reports on the current state of our knowledge in the various branches of the science, each written by an authority on the subject with which he deals.

The Institute provides a library from which books may be borrowed by Fellows. It contains, in addition to the standard works of reference, a number of rare and valuable books, while its collection of periodicals, and in particular of foreign periodicals, is good, and contains items either not obtainable elsewhere or not readily accessible.

As man exists both in time and space, it follows that the study of man and his activities must be pursued subject to two sets of conditions, conditions of time and conditions of space. These conditions, however, although logically separable, cannot in practice be made to stand apart. Comparison is of the essence of anthropological investigation, and the study of man in time is inextricably interwoven with the study of man in space, and vice versa; nor is it possible in looking at the material from the point of view of its utility to the educationist, to regard the study of man in time as peculiarly the province of the historian and the study of man in space as the province of the geographer ; for both, material must be drawn from the two sources, the one supplementing the other. In other words, the difference between the two sets of conditions involves a difference in method, but not in result. The Archæologist who studies man in time, and the Ethnologist who studies man as distributed in space, both aim at the same gaol, the elucidation of his origin and essential characteristics. The Geographer, however, notwithstanding the fundamental pre-occupation with problems of distribution imposed by the nature of his study, must inevitably take the dimensions of both time and space into account.

From the standpoint of the geographer, the material furnished by anthropology may be utilised either on a regional basis or as an example of geographical control, or in relation to the question of distribution. From the two points of view first named, the vast store of facts accumulated in anthropological literature, and particularly in the publications of the Institute, affords an almost inexhaustible mine of material. From this it is possible to take any part of the inhabited world and build up a picture of the physical and mental character of the inhabitants, their modes of life, habitations, clothing, industries, arts and the like, their social habits and customs and their religious beliefs, while if these are considered in relation to the geographical conditions, it is possible to show how these conditions have affected the mode of life in all its elements,—how in one set of conditions will be found a hunting community, in another a nomad pastoral people, and in another a sedentary agricultural population, each with its characteristic mentality and culture. It will also be possible to show how each element in this culture has reacted to the conditions, and the effect of these conditions on the technique of material culture, even in quite minute points. Incidentally I may mention that the value of a study of primitive technique in education, especially in the early stages of education, is becoming widely recognised, particularly in the United States.

Now while the utilisation of anthropological data in the manner thus suggested is comparatively simple, it is when we come to questions of distribution and, more particularly, the question of the origin and distribution of racial types, that association with a body such as the Royal Anthropological Institute should prove of especial value to the student and the teacher. The data are incomplete and relatively scanty, while their interpretation in many of the more important points is a matter of controversy. Expert guidance in weighing the evidence and in estimating the validity of conclusions is essential. The ethnologist, by studying the physical character of man as at present distributed over the face of the globe, aims at classifying his different varieties and demonstrating their affinities with a view ultimately of reducing them to their main stocks and showing whether they are or are not traceable to one main stem. This investigation, however, is complicated by two disturbing elements, migration and racial contact. In a country such as our own, into which there have been successive waves of migration, the question becomes one of extreme complexity, for the elucidation of which the data are far from being sufficiently complete. It is for this reason that the Royal Anthropological Institute has repeatedly urged upon the Government the desirability of an anthropometric survey of these islands. The question is of more than academic interest. It is of the highest practical importance. It is commonly stated, for instance, that a manufacturing population is stunted in growth by industrial conditions, and when medical inspection in schools was instituted, medical officers in certain areas were inclined to diagnose malnutrition in cases where children were under what they regarded as the standard of development, a standard which was, no doubt, based upon an average which did not differentiate between the short, dark type and the tall, fair type. It has been demonstrated that the short, dark type in our population tends to gravitate towards industrial occupation and city life, while the tall, fair type, like its Nordic ancestors, tended to prefer the agricultural open-air life. Professor Fleure has shown how persistently certain physical types tend to follow a certain occupation. The study of racial psychology is hardly sufficiently advanced to admit as yet of any broad generalisation, but it is not impossible that much of the so-called class antagonism and industrial unrest may possibly be due ultimately to a difference in outlook traceable to a difference in race.

The question of racial migration and racial contact is closely connected with that of the migration of culture and culture contact. In this connection I would call attention to the scheme for recording rural lore in Wales through the agency of the schools and to urge the importance of the institution of a similar scheme in other parts of these islands before the memory of old customs, traditions, beliefs, place-names, folk industries, and the like has entirely passed away. This evidence would undoubtedly prove of the greatest value in throwing light upon the questions with which we are concerned, for although the ethnologist in tracing back a physical type in the countries of ancient civilization has at his command a written history which records the more important immigrations or conquests, yet he must, sooner or later, call to his assistance the archæologist. With the assistance of the data furnished by the archæologist, the evidence of skeletal remains is interpreted to throw light upon the movements of races during the dominion of the great races of antiquity in the Mediterranean area and in Mesopotamia, in the Iron and Bronze Ages, and in the preceding Stone Ages. In the Palæolithic Age, the question of the relation of modern man to earlier types comes into prominence, and Neanderthal man, the recently discovered Rhodesian skull, the Heidelberg jaw, the Piltdown skull, and the Java Pithecanthropus, afford data for the discussion of the descent of man and his relation to the anthropoid apes,—a matter which will be discussed at an early meeting of the Institute.

In conclusion, if education be regarded as guidance in acquiring experience, no medium more suitable than anthropology could be found. I would plead for the introduction of some measure of anthropological teaching in every school and educational institution throughout the country, not merely because it is of value in necessitating a grasp of detail or because it affords a training in weighing evidence and generalising therefrom, not because it gives a breadth of view and a sense of perspective such as cannot be as readily acquired by the study of any other branch of science ; my ground for urging its claims is that its study necessitates a particular point of view. Anthropology requires from the student sympathy and understanding with those whose habit of mind is alien to his own. Those of us who are interested in education feel strongly that the future generations must be trained to think anthropologically. Both in our internal and external relations, difficulties arise from differences in point of view which are based, to some extent, possibly to a greater extent than is generally realised, upon racial and environmental differences. It is only by complete understanding of and sympathy with the other fellow's point of view that we may hope to attain in the internal affairs of the nation and in international relations that lasting peace in the future which we all ardently desire.

Geology of Belgium. (Geological Association). EDWARD STANFORD. 3/6.

This little book, issued July, 1921, under the editorship of Mr Arthur Holmes, will be welcomed by geographers as well as by geologists for its account of the rocks of Belgium by a series of distinguished specialists, with the accompaniment of a coloured map-folder.

The physical geography is treated under the headings of the northern lowland, the southern upland, and the long narrow coalfield. Then follows a geological history which strikes this reviewer as of the greatest interest. The special articles on the different periods go into detail about fossil sequences and stratigraphical minutiæ, but a good deal of geography can be gleaned from them. The excursions of the Geologists' Association are events that may be recommended to the special attention of members of our Association.

A Scheme of Geography in use in an Elementary School, with Notes on Apparatus.

CAPT. JAS. D. BALLANTYNE

IN Dumfries the supplementary classes are centralised as far as possible in one school, George Street P.S. In most years the classes may number up to 200 pupils, but fully half leave without completing the full course, although bright scholars who come up young enough usually manage to complete the three years' course. The six classes are organised in three, 1st year ; two, 2nd year ; and one, 3rd year. Each class attends for six periods for geography, but two of these are given to historical geography. Each period is for 40 minutes. The last two lessons each afternoon are given to one class, and thus all except the 3rd year class can be taken out once a week, weather permitting.

The geography scheme is as follows, but is subject to adjustment each year, and may also be expanded to serve Continuation Classes :—

YEAR I.—THE CRADLE OF THE BRITISH PEOPLES.
110 (a) The Dumfries Basin.
120 (b) Scotland.
130 (c) Britain and her Seas.

YEAR II.—THE HOME OF EUROPEAN CIVILIZATION.
140 (a) The Meaning of Europe.
150 (b) The Southern Slope.
160 (c) The Northern Slope.

YEAR III.—THE SPHERE OF HUMAN ENDEAVOUR.
170 (a) Lands of the Old World Island.
180 (b) The Americas.
190 (c) The Southern Lands and Seas.

The sub-headings indicate a term's work, and this usually includes ten lessons, supplemented by special lessons on physical laws, etc., where needed. A " lesson " may extend over any number of periods, but four is the average, i.e., 160 minutes.

The term's lessons on the Dumfries Basin—our home region—are divided as below :—

*110. The Position of Dumfries.

A map constructed on scale 1in. to 1 mile, showing each 100ft. contour, is used, and followed by an excursion to the Craigs, which rise 312ft. above the town.

111. The Relation of the Basin to the Southern Uplands.

Here the geological map is introduced, with outdoor excursion for specimens and indoor work on the specimens collected.

112. The Soils and their Formation.

Most of this is again out-door work ; examples of wind-borne soils are found in odd corners of the Craigs, and marks of wind erosion can be seen, estuarine, marine, and lake deposits can be examined, along with a great line of moraines—all close to the school.

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* Hundreds figure is subject index 1—geography; 2—history.
Tens figures give term—nine in three years.
Units give order in lesson sequence. Thus 184 gives 5th lesson, 8th term in 1—geography

113. Changes in the Course of the Nith.

This is a lesson in geographic deduction to get the children to account for the strange bifurcation of the valley and the fact that the Nith for its last five miles runs in a narrower valley than it does twelve miles from the sea.

114. Plants of the Neighbourhood.

This is mostly completed in holidays. Samples of the great associations are seen and type plants—mountain and meadow grass, pines, oak and beech, birch and alder, heather and heath, armeria and bog-moss. Maps are drawn shewing approximate vegetation areas.

115. The Climate of Dumfries.

No special records are kept at school, but general trend noted. The local observer at the Crichton Royal Institution supplies us with a copy of observations each week, and 1st year classes work out the means and graph them. These graphs of known and experienced weather are kept for comparisons later.

116. The People of Dumfries.

Types are chosen from classes as early as one may—Picts, Britons, Angles, Norse, Norman ; as shewn also in names of people and places.

117. The Strategics of the Basin.

A study of the road and topographical map. Dumfries considered as a military outpost against Galloway to render safe the great road to the south. The outer defences of the vale and the inner or town defences. The town never had a wall.

118. The Industries of the Area.

(a) Agricultural.
(b) Industrial.

With mapping of characteristic occupations in vegetation zones. (Fuller notes follow).

119. The Possibilities of Development.

The suggestions are all supplied by the children after home consultations. They can usually be grouped as follows :—

(a) Improved administration (county division divides town)
(b) Better use of the land.
(c) Use of water to generate electrical power.
(d) Improvement of estuary.
(e) Reclamation of Lochar moss and merse lands.
(f) Town-planning schemes.

(118) ENVIRONMENT AND OCCUPATIONS.

1. The outer bounds are high, grassy hills, only here and there developing into heath land. Here sheep and the shepherd are left alone with the peewits and curlews. At the hiring fairs in the town, the tall (usually very tall) shepherds with their plaids and dogs form a novel sight, and the change of master means a great migration of families each year. This tells particularly on the schools as regards numbers. The great sheep and lamb sales each year attract buyers from the South.

2. The remnants of the old forests still left provide occupation for woodmen, and the sawmills in the town are fed by motor lorries. The axes and saws used generally form a great display in ironmongers' windows each autumn.

3. The lower lands are covered with rich farms. Dairy farming is the mainstay. The favourite rotation is oats, turnips and potatoes, grasses and clover. Oats and turnips are usually fed to the Ayrshire cattle, but "Provost" oats are of local production, and great loads of potatoes are a common sight in Dumfries. To supply the farmers, implement makers and seed merchants centre at Dumfries. The milk trains form a feature of everyday life. Great cattle fairs, e.g., the Rood Fair, were held each year, but now the auction marts have usurped their ancient importance. "Cheddar" cheese is a speciality of this area.

4. At the estuary at Glencaple, fishers and their boats can be seen—whammellers. But fixed nets—"paidle" nets—are a feature along the shore. The salmon fishers and their nets are a common sight at the "caul" by the town mills.

5. At Locharbriggs, quarrymen form most of the population, and the red sandstone obtained is the common building material of the town. Peat used to be largely cut, but coal is taking its place.

6. The great number of landed gentry in the area maintain gamekeepers, who can be taken—with their masters—as the last representatives of the old primitive hunters.

7. The town as a home of traders, collectors and distributors can be illustrated by observation.

8. The tweed and hosiery mills of the town, and the reasons for their existence, the defunct cotton industry, and reasons for its decline, afford room for discussion. Mineral water factories and other small local enterprises all need explanation.

The historical side is treated as below :—

I.—THE EVOLUTION OF THE BRITISH PEOPLES.

210 (a) Folk Settlements in Britain.
220 (b) The Consolidation of Britain.
230 (c) The Growth of the Britains.

II.—THE GROWTH OF EUROPEAN CIVILIZATION.

240 (a) In the Mediterranean.
250 (b) Along the Atlantic Coasts.
260 (c) Eastward into the Land Mass and Westward over the Water Mass.

III.—THE SETTLEMENT OF THE WORLD.

270 (a) The Heartlands.
280 (b) Monsoon Lands.
290 (c) The Portioning of the Great Islands.

The whole is an attempt to give children whose education is completed at fourteen years an outlook which will help them to be intelligent citizens. Sir H. J. Mackinder's School Series are used, but only for revision. The fuller equipment of the class-room is a matter of time, but so far I have managed the following :—A hanging globe, 2ft. 6in. in diameter, and weighing with its counterpoise over a hundredweight. It was an obsolete globe, so ancient that Africa was a blank, but a covering of the continental areas with B.B. preparation has well repaid the labour, as they are so large that I am spared B.B. outlines, since I can colour all facts directly on the globe. Most of the maps—maps to bring out one fact only—I have to make myself on stout paper, but the Education Authority has given me a roll of calico, 160 feet of wooden rollers, screw eyes and hooks, etc., to suit. Then to house all these in a tall map cupboard I had strips of wood 1¼ft. wide fitted to slide out and in at the top. Along the centre of each are placed eight screw hooks. Each map roller is fitted with a screw eye at one end by which to hang it up on the slide. Smaller maps have a screw hook at the other extremity, so that they can be hung in a string one from another. Thus I can house over 64 maps, and yet reach out any one without disarranging the rest. The walls are fitted with a slotted moulding, and 15in. above a strip with hasps each 12in. apart. All illustrations are mounted on brown paper cut to a uniform size, and each bears the index number of its lesson. A nest of shallow drawers houses these when not in use, and they are kept in position by strips of millboard 2½in. wide x 15in., which slip into the slot below and are then retained by the hasp above.

Owing to lack of cupboards the rock specimens are housed on the window sills in large flat trays with hinged glass lids made by the boys. Each specimen is fixed to a piece of millboard of uniform size, so that five rows of ten complete each case. In the science room butterflies, plant specimens, and birds' eggs are kept in similar cases, but hung. The lesson notes and each picture sheet in the portfolio are numbered according to scheme—1st figure, 1—geography ; 2—history ; 2nd figure indicates which term in the full course, there being nine in all. The third figure indicates the sequence of the lesson in the term, O being the first. Using a loose leaf notebook one can insert any useful data for a future lesson at any time and be certain of it turning up again just when required. The pictures for each week's lessons can be picked out by any child and put up on the walls.

SUMMER SCHOOL OF GEOGRAPHY 1922.

London School of Economics
(LONDON UNIVERSITY),

THE Summer School of Geography will be held at Dunford House, near Midhurst, Sussex (Country Hostel of the London School of Economics) from July 31st to August 12th.

Lectures, classes and survey work will be carried on under the direction of the Geography Staff, assisted by Professor Gordon of King's College, London, and Dr. Russell of Rothamsted Experimental College, Harpenden.

As the accommodation is limited, application should be sent in before the end of April, and should be accompanied by the fee for the course, viz., £2 2s. 0d. Hostel Fee: from £2 8s. 0d. to £3 3s. 0d, per week, to be paid at the end of the course.

Applications should be addressed to the Secretary, London School of Economics, Houghton Street, Aldwych.

JULY 29th to AUGUST 19th, 1922, Bangor Normal College Summer School in Geography for the fifth consecutive summer. Apply, Principal D. R. Harris.

Geography Syllabus in use at the William Ellis School, N.W. 5.

V. C. SPARY.

AIM AND PRINCIPLES.

1. REGIONAL GEOGRAPHY.

THE First Form (lowest) studies the Homeland from the immediate neighbourhood, and the land not seen and known, less intensively. The school's position near Parliament Hill is favourable to an accurate idea of geographical terms, and a scale can be formed with which other land features may be compared. Theoreticallv one should go slowly from what is known of the home region to the neighbourhood in general, and work through England and Europe to the unknown lands of the world. As a matter of fact, something is known very early of the world at large, and what is beyond the horizon by a few miles is almost as little known as if it were 1,000 miles away.

Thus immediately after the Homeland, there is a jump in the Second Form to learn about the world.

In the Third Form, Europe and North America are chosen for more intensive study, partly because the pupils should know something of these lands, as a preparation for the following year's work, and partly because they supply similarities and contrasts, the study of which furthers the geographical outlook.

In the Lower Fourth Forms, intensive study is continued for those who have already been through the previous part of the course, and those junior scholars who have come in make a beginning at home by considering the British Isles from many points of view, and their connection with other lands. But in order that the British Isles may have a world setting, and also to make sure of the groundwork of the new boys, the first term is spent in the outlines of the world's geography.

The Americas are considered in the Fourth Form because they exemplify points in physical geography which can now be appreciated, for in North America the European races find scope for their surplus population. Asia and Australia present new problems to the Fifth Form. In the former, the meteorological side of geography can be conveniently treated. In Europe and Africa, most of the threads can be pulled together, and the economic condition of the modern world studied by the Upper Fifth. In the Sixth Form the regional geography of the world is quickly revised.

2. GENERAL GEOGRAPHY.

There is no hard distinction between general and regional geography, but certain geographical ideas (seasonal distribution) and subjects (such as physical geography) which to a certain extent are independent of any particular region, are introduced, though no region may be studied without a consideration of these. Others (map drawing) are more independent. An attempt is made to take them :—

(1) As far as possible with regions with good illustrations ;

(2) To grade subjects so as to fit curriculum of the school and the scholars' capacity ;

(3) To cover the whole field of general knowledge at least once, and to revise continually general ideas already learnt when studying fresh regions.

The main aim is to study the inter-action between activities of man and his physical environment, and in carrying this out, physical geography is subordinated to human, economic and political geography. Only in the Upper Sixth is it possible to take definite courses of the purely scientific basis of geography.

INTRODUCTORY COURSE.

FORM I. 2 periods. No text book.

I. The Homeland.

(a) Plans of geography room, the corridor outside, the school playground.
(b) Plans of the school in its setting of roads and railways.
(c) District maps to illustrate ways to school, where the railways go.
(d) The highlands of Parliament Hill, and the directions in which streams flow.

Orientation is emphasized throughout.

(e) The foregoing leads to an idea of the Thames basin, and the hills to the north and south.
(f) Great Britain very generally. The Highlands in the north and west (Scotland and Wales); the surrounding seas; one or two towns.

II. Stories of other lands (mountain and plain).
Other climates (cold and wet, hot and dry, hot and wet).
Other vegetations (desert, forest, grassland).

Maps are made of known areas to explain the idea of mapping; of unknown areas, to teach further ideas. The maps merely decrease in scale.

Other lands, etc., are taught by means of pictures, lantern slides, and stereoscope views, and the use of the globe. Typical countries are selected, e.g., Norway, Switzerland, Egypt, etc.

Daily observations are made of—

(1) The length of a sun shadow at mid-day.
(2) The kind of weather—recorded pictorially.
(3) The kinds of clouds.

FORM II. 2 periods. Text-book, "The Round World" (Fairgrieve).

The broad outlines of the geography of the continents, with special reference to the way men live—houses, food, occupations.

A definite attempt is made to associate type of occupations with types of vegetation and climate.

Illustrations—lantern slides, pictures, stereograph.

Plasticine modelling of simple regions.

Daily observations are made of the strength and direction of the wind and whether the day is rainy, sunny or dull.

FORM III. 2 periods. Fairgrieve's "The World."

North America and Europe.
The traveller in these lands.
How he would travel about—by land and water.
What he would see.
The relief of the land and its covering of plants.
The chief towns and ports in relation to American life and European life.

Daily observations are made of the maximum and minimum thermometers.

A monthly record is made of the height of the sun (in degrees) at intervals of 45 minutes on a specified day.

FORM IV. 2 periods. Mackinder's "Our Own Islands"; Bartholomew's ½in. maps; Visual Contour Atlas.

I. Outlines of the world's geography.

II. British Isles (especially the control of human activities by the geographical conditions).

The position of Britain with regard to the other lands.

Separation from the Continent; the narrow seas; position on the ocean; the tides; tidal rivers; effects on commerce.

Highlands and lowlands in detail to show the relation of physical divisions to the :—

(i) Productions.
(ii) Natural routes.
(iii) History.
(iv) Political divisions.

Special attention is given to the question of reasons for sites of some of the most important and typical cities of Britain.

Now that the highlands and lowlands are conceived as areas, the pupils are introduced to the ideas of contour lines. Such are drawn, and sections constructed.

Daily observations are made of the wet and dry bulb thermometers.

NOTE.—Under heading II. the treatment of the subject matter leads in the summer term to a special study of the school neighbourhood in its relation to the London Basin. Local journeys, on which the lessons are based, are arranged.

'FOUR YEARS' COURSE.

FORM IV. Two periods. Tarr and McMurry's "North America"; Philip's Atlas of Comparative Geography; Brooks' "The Americas."

The larger area of North America is considered in detail just as Britain is in the Lower Fourth. South America provides contrasts and similarities. Also :—

(1) The idea of geological history as exemplified in (a) Coal period; (b) Ice age.
(2) Maps are constructed from statistics—population maps of different areas of the U.S.A.
(3) The use of the curves of rainfall, temperature, population; to illustrate variations of factors of time.

Records of rainfall are kept by boys of the form in turn.

FORM V. Three periods. Brooks' "Asia and Australasia"; Philip's Atlas of Comparative Geography.

1. The size and shape of the earth; movements; day and night; the seasons.

The annual and seasonal distribution of temperature; pressure and winds; causes of rainfall—annual and seasonal distribution; ocean currents; natural vegetation.

Regional geography of Asia; physical and climatic considerations; natural regions: (1) the North-west Lowlands; (2) South-west Asia (emphasising the great routes); (3) Monsoon lands, India, Indo-China, China, Japan, etc.; (4) Interior plateaux; (5) East Indian Archipelago.

Australia is taken in such a manner as will test if the principles already learned have been mastered.

Fold and block mountains; plateau and plain (Asia).
Rift Valley (South-west Asia).
Volcanoes (Japan).

Transverse ; longitudinal, meandering streams (China).
The Delta of the Ganges.

OBSERVATIONS.—The barometer is read daily, and corrected for altitude and temperature.

UPPER FIFTH. Three periods. Text books : Herbertson's Junior Geography ; Mrs Herbertson's Clarendon (Part I.) ; Philip's Modern School Atlas ; One form Brooks' Africa and Europe.

The detailed general and regional geography of Africa and Europe. In connection with Africa, an attempt is made to lead definitely to the idea of the natural region. The general physical and climatic geography of Africa gives a good opportunity for revising the general principles of climatology, especially of those facts associated with the apparent seasonal migration of the sun.

The economic point of view is emphasised, and stress is laid on the relations between the natives and their European overlords.

The regional method is also pursued in Europe, but the political unit is the unit for teaching purposes. (In Africa the teaching unit is the natural region).

Whenever suitable, the relations between history and geography are carefully noted, and the comparisons between different countries are studied in detail. In connection with the British Isles, the opportunity is taken to study continental shelves and tides. The two continents also give ample opportunities for the revision of rift valleys, types of mountains, lakes, the work of ice-sheets and glaciers, influence of rock character on surface features, etc.

OBSERVATIONS.—Each boy in turn hands in a written account of the sun's 'path' on a selected day, including time and direction of sunrise and sunset, length of daylight, length of twilight, height of mid-day sun.

FORM VI. Three periods. Text books : Brooks' "The World" ; Herbertson's Senior Geography ; Philip's Modern School Atlas.

In this form the first public examination (London General School) is taken.

(I.) The outlines of World Geography, leading to a division of the world into major natural regions.

(II.) The regional geography of the Americas, with most attention to North America and the more important of the South American Republics.

(III.) The study of the Daily Weather Report, leading to a revision of the British Isles and Europe.

(IV.) The remainder of the world, with special reference to the monsoon lands of Asia.

Throughout the revision work, mapping exercises are extensively used to test if the work has been mastered. Mere copying of maps is not required, but boys are trained to map geographical facts with clearness and accuracy. In addition, essays on geographical subjects are set.

OBSERVATIONS.—By a study of the Daily Weather report, each boy attempts weather forecasting for the United Kingdom.

UPPER SIXTH. Three periods. Two Years' Course. Text books : Marr's "Scientific Study of Scenery" ; Unstead and Taylor's General and Regional Geography ; The Weather Map (Stationery Office) ; The Advanced Atlas (Bartholomew's).

The Physical Basis of Geography.
- (I.) The Outlines of Meteorology.
- (II.) The Outlines of Geomorphology.
- (III.) Map Making and Map Projections.

Regional Geography.
- (I.) Outlines of the world, general, regional, and economic geography.
- (II.) Detailed geography of the Mediterranean region, or Western Europe, or Monsoon lands of South-east Asia.
- (III.) Detailed geography of the school and district.

The Geographical Background of History.
- Illustrated by a course on the outlines of the Historical Geography of Europe.

NOTE.—There is also a two years' course in economic geography for those boys in the Upper Sixth who take an advanced course in modern studies.

JULY 29TH—AUGUST 28TH, 1922.

Mr H. V. Davis asks us to state that he has organised a private touring party. A vessel will leave Southampton at 6 p.m. on July 29th, and will visit the following places, where excursions will be organised, and where members of the party will also be free to study things in which they are particularly interested:—Oporto, Lisbon, Gibraltar, Algiers (an alternative four days' trip overland via oases to Tunis), Tunis, Malta, Sicily, Strombolt, Naples (Vesuvius and Pompeii), Rome, Corsica, Balearic Is., Tangier, Cadiz (Seville), and Vigo Bay. Between ports, lectures and seminars on Oceanography, Navigation, Botany, History, etc., will be given as desired.

Inclusive charge for the round trip to be fixed according to berth and cabin occupied. The members of previous Summer Schools in Chamonix and the Snowdon country cordially invite those interested in "Education by Travel" to join the party. For further particulars send stamp to H. Valentine Davis, "Noddfa," Wistaston, Crewe.

UNIVERSITY OF OXFORD, SCHOOL OF GEOGRAPHY.

Vacation Course, 1922.

THE ELEVENTH BIENNIAL VACATION COURSE at the Oxford School of Geography will be held this year from TUESDAY, AUGUST 8TH TO FRIDAY, AUGUST 25TH.

A Preliminary Programme of the Course will be issued about the end of March, and will be sent to those who apply to THE SECRETARY, SCHOOL OF GEOGRAPHY, MANSFIELD ROAD, OXFORD.

The number of students to be admitted will be limited. Names can be registered at once for provisional entry.

PLEASE NOTE CHANGE OF ADDRESS.

Commodity Maps

By Ll. Rodwell Jones,

Cassel Lecturer in Geography in the University of London.

[Reprinted from " Economica," No. 3, October, 1921, by kind permission of the Editor.]

§1. A GOOD MAP is a triumph of synthesis. Consider a little its origin. Look beyond the familiar lines, colours and conventions of the atlas. Let scene after scene of a country as you know it pass before your eyes, and, for a moment only, so far abrogate your æsthetic sense as to people each with a few scattered groups—intent little mortals with rod, chain and theodolite, busy for hours on some small corner of your single transient view. What myriads of observations, checkings and corrections, what heaps of detailed survey sheets, have been condensed into the well-known features of an atlas map ! The thought helps us to realize how great must be the elimination of detail which results in such condensation. On the other hand, the completed map is an organic whole. Unrelated, the data on which it is based are so many dead facts. But a good map should be a living thing, full of suggestion as well as of information.

Now we are concerned in this article with commodity maps. But they, in common with all other maps, present these two characteristics : the loss of perfect representation consequent upon any system of reduction, and the gain of some vital quality quite foreign to the detailed statistics upon which they are founded.

The ideal map is simply a model of a portion of the earth's surface. It should show everything—relief, agriculture, communications, etc. Practical considerations of manufacture and storage necessitate the contoured map instead of the raised model. Similarly, difficulties of map technique make it advisable to use several different maps for relief, climate, soils, commodities, etc., instead of trying to place all the required information upon one map. It must be definitely stated, however, that maps showing commodities can only be properly appreciated in connection with physical maps of the same area, or by people having the information available in such maps. The extent to which a commodity map facilitates such correlation is a measure of its usefulness.

It is the first function of a commodity map to provide information. At sight, and without the manipulation of statistics and the consultation of gazetteers, one should be enabled by it to know where and in what quantity a certain commodity is produced. It cannot replace the exact figures of the statistician for certain specific purposes, but it may be sufficiently quantitative in character to indicate at a glance the relative importance of different areas in respect of a certain commodity. Difficulties of map technique—we will refer to some presently—on the one hand, and difficulties in the collection of statistics on the other, account for the low level of production maps to be found in most atlases of Economic Geography.

One such work, quite representative of the class, is now before the writer. On a map of Brazil a colour smudge purports to represent the production of coffee. Well, so far : Brazil is almost as notorious for its coffee as for its nuts ! But does the smudge suggest anything further? This atlas deals with world commodities, and similar smudges in various parts induce one to think that some of these other regions are more productive than Brazil, for some of them obviously cover a greater area. This is unfortunate, for actually the Brazilian production is much greater than any other.

A rough calculation with regard to our Brazilian coffee marking shows it to represent some 80,000 square miles, or considerably more than the area usually under wheat in the United States! Moreover, since it covers map areas representing the greatest diversity of relief, it suggests that coffee has a much greater climatic range than is actually the case. As an index to coffee production the map is inadequate, to say the least.

But there are commodities more important than coffee—though certainly this map seems to suggest the contrary—and we will turn to a coal production map.

The map compiler's descent here is clear. "Now," he seems to say, "I will allow myself the luxury of accuracy. To tell the truth, I wasn't very happy about that coffee map myself; but in this case I can consult the records of physical science. Geological maps are available, and published by a Government Department, too!" And "spotting" with glee many areas of quite easily traceable "coal measures" in his geological map, he proceeds to transfer these, and these only, to his use, unembarrassed by the wealth of colour and design exhibited by surrounding portions of his original. Having shepherded them from their bizarre environment to his own white sheet, he begins to believe in them. To his vivid but untutored imagination they become almost as solid masses of coal. They are usually printed black in the textbooks. Their map area is full of quantitative suggestion of reserves at least, if not of production.

Now all this is unfortunate, for the geologist—pure seeker after truth—is concerned in his map with the areas of outcrop of certain formations. His classification of these formations is based on relative age, as determined by fossil content and by stratigraphical evidence, and his grouping is such that each formation embraces a great variety of lithological character. What he marks as the coal measures of the Upper Carboniferous may, and probably do, contain some seams of coal. They are, as it were, the symptoms of a particular type of deposition, and he values them in the first instance as a means of correlating the rocks of one exposure with those of another. Of course, the more detailed his studies[1] the more information of definitely economic character emerges, and it is to the professional geologist that one must turn for information as to the mineral resources of any area; but the "coal-fields" of the elementary economic map are not derived from the detailed studies and sections of the mining geologists, but from elementary geological maps in which the coal measures are marked merely as one of a series of groups of historical geology, and without any reference to the number, depth, and thickness of the coal seams; with no reference, in fact, to what we may term the mining accessibility of the coal.

Often large areas of coal measure outcrop are barren of workable coal. Often again the measures dip under newer rocks, and the coal is worked by shafts sunk under these; that is to say, in areas not marked as coal measures at all on the outcrop map. But it is the coal measure outcrops which are traced off, separated from the surroundings of the geological map—surroundings which tend always to explain their structure—presented stark on the pages of every elementary atlas, and there designated coal-fields.

If the origin and limitations of such maps are clearly proclaimed, and as clearly understood, they have their uses. Quite often they mark accurately enough for elementary purposes the general location of some of the most important of the world's producing areas. But to the uninformed they are apt to be entirely misleading. Thus the economic atlas gives no indication of coal in the Dutch Campine, or between Doncaster and the Trent. Concealed measures are not marked. They are often of very great importance.

Or the beginner is apt to be obsessed by the mere area of coal measure outcrop. On such a basis the Western interior fields of the U.S.A. (Iowa, Kansas, Oklahoma, Texas) might be supposed to have accessible reserves comparable to those of the Appalachian field, or the Michigan field to have possibilities at all comparable to those of Illinois.

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[1] His studies must keep pace with the development of the field. Each opening up of a colliery provides him with fresh data—available in no other way—upon which he may base advice as to the next step in development.

For showing actual production, such maps are entirely useless, for to the enormous variations in mining accessibility of various parts of a field is added the difference due to varying degrees of development. Many large fields of immense and accessible reserves have only a tiny production because their development is only just beginning.

One has perhaps said enough to make it clear that our mapping of commodities, whether by crop areas, crop yields, or mineral output, is at present quite inadequate. Most published maps of this nature give little accurate information. Frequently they are misleading.

It is only proper to state here that the map producer is probably aware of the unsatisfactory nature of such maps, and he quite rightly resents criticism of them as quantitative when all he essays to show is qualitative. What we are concerned to emphasise is that commodity maps indicating with so little exactness where a commodity is produced, and showing not at all the amount produced, are useless and often worse than useless.

§2. Now let us see what are some of the practical difficulties which are preventing the publication of useful commodity maps. Suppose we take the case of the production of wheat in England.

We can easily get the amount produced in any year for the whole country. That may serve for an elementary comparison with the production of other countries, and we may elaborate the figure by finding the production per head of the population. The comparison of the very few and simple figures resulting gains nothing by map representation. So we go a step farther and find that a kindly Board of Agriculture gives us the wheat production per county, and even a cursory glance at such a list indicates that there is a very varied production. But the counties vary greatly in size, so we divide the production of wheat in each by the area of each, and so obtain a kind of wheat density figure. At once it becomes apparent that there are great differences in the degree to which wheat is cultivated in the various counties, and that there is a definite geographical grouping of the counties of high wheat cultivation. This becomes particularly striking if we take a map showing the county boundaries. Then grouping out counties according to their wheat density, and adopting a scale of progressively deepening tints corresponding to these groups, we apply to each county its proper tint, and so obtain a simple wheat production map. We notice at once that wheat is a noteworthy crop in our south-eastern counties, and we are most of us well enough informed to realise that climate and soil are big factors in this distribution.

But such a map is not really satisfactory even for a very general study. We know enough about our counties to realise that there is none of them with a perfectly even distribution of wheat crop throughout its area. Nearly all, and particularly those of the south-east, have each many varieties of soil and some varieties of relief and climate. The county division is too large. The next divison is the parish. Maps showing the outlines of parishes are published, but the parish production figures are not available. They exist in official records, but they are not published. They have occasionally been used by special permission of the Board of Agriculture, and crop density maps for small areas have been made in connection with many detailed geographical studies. But none are published, and no large area has been so dealt with.*

Now a crop density map on the parish basis begins to show clearly the effects of even the minor variations of soil and climate.

An elementary geological map will show the surface of Central and Southern England to consist of a series of parallel belt-like out-crops running in a general line from N.E. to S.W. and comprising Triassic, Jurassic,

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* Since writing this the "Agricultural Atlas of Wales," published by direction of the Ministry of Agriculture and Fisheries, has appeared; the first of what will be a complete and excellent series of agricultural maps of the British Isles, based on parish figures officially provided.

Cretaceous and Tertiary formations consecutively. One must make it clear to any minds innocent of all geological reading that this major classification is based on relative age, and that each of the above-mentioned formations includes many and various rock materials. Thus the Cretaceous, over much of its outcrop, may consist of a chalk, a chalk marl, a heavy clay, a friable sandstone, a heavy clay again, etc., and since a sequence is maintained, a number of minor belts of rocks, hard and soft, porous and non-porous, fertile and infertile, appear within the Cretaceous belt, and parallel to its outcrop boundaries. So with the other formations.

Thus a crop map based upon parish figures clearly indicates these belts of arable land, alternating with belts of lesser fertility, and becomes an illuminating commentary upon the geological map. A parish is often so small an area that no essential change of physical conditions will occur within its boundaries, and upon this fact rests the possibility of constructing good crop density maps on a parish basis. But on the other hand, it too frequently happens that the parish, though small in area, is elongated sufficiently (and often from an historical point of view, purposefully), so that in several miles of length, say, it overlaps a considerable variety of soils. Marsh, meadow, arable and woodland soil strips often occur cutting across each of several parishes, and obviously when this happens the correspondence of physical and crop maps will be to some extent vitiated.

This elementary instance has only been elaborated to show the dependence of all crop density maps on statistics of area and production, and to show, further, that even in the most favourable circumstances—and the publication of statistics for areas less than parishes is hardly conceivable—exact correlation with physical environment is not attained. Let us emphasise once and for all that the chief difficulty in the construction of agricultural commodity maps is the fact that statistics are not usually available for sufficiently small areas.

§3. Now the interrelation of man with his environment has been a very usual theme in educational work of recent years. In particular, an attempt is made to relate agricultural production to climate and soil, manufacture to the locations of natural sources of power and of raw materials, and both to the possibilities of transport.

Not that the physical is regarded as the sole and determinative influence, for rather the tendency is to see in man's history the gradual emancipation of the creature of physical circumstance. Apart altogether from the more disputable questions of moral and ethical progress, our age must stand out for its analysis of those physical factors which have influenced and partially controlled the activities of mankind, and as witnessing the beginnings of a conscious and reasoned, rather than an unconscious and fortuitous adaptation to, and of, environment.

The matter is not so irrelevant as may at first appear. In his presentation of these evolutionary tendencies, the schoolmaster and the university teacher are hampered by want of material. The map may be the humblest part of the teacher's equipment, but it is a necessary one. The spade does not make a gardener, yet he must use one.

In fact, it is the educational nature of such maps that must be especially urged. From this educational standpoint a chronological sequence of production maps has quite special value. To take an actual and simple example, let us for the moment regard man himself as a commodity. The U.S.A. census shows a decennial sequence of population maps from 1790 onwards. These not merely state the gradual expansion from coast settlement to the Middle West, to the High Plains, and ultimately to the Pacific ; they show it in such a way as to be a constant challenge to the historian. They ask questions, the answers to which rest largely in the physical environments encountered. They define the line of enquiry, and save much actual time.

Or again, a quinquennial series of maps for some great agricultural commodity, wheat or cotton, say, would show not merely the development of new lands, but the changes in distribution consequent upon new types of agriculture ; the invasion of areas at one time considered unsuitable for the particular crop considered, by means of irrigation, dry farming, seed selection and adaptation, or a more scientific use of fertilizers.

One cannot too much emphasise the thought compelling quality of such maps, quite apart from the actual information they present.

§4. A word as to some technical difficulties involved in quantitative map production. Three main methods appear. Each has its special uses and its limitations.

The first is the method of pure reduction and is only partially quantitative. One may take an aeroplane photograph as an example. If such a photograph distinguishes between arable and grass land, or between certain crops (as it does in some lights), then it resolves itself into an excellent detailed commodity map. The writer is not suggesting that aeroplane photographs should be used for this purpose—though their important place in general map making is common knowledge—but is merely giving an illustration of the type of pure reduction maps. Each field is shown in its relative position, occupies its proportional area, and may be marked with its appropriate crop symbol. Such maps are only partially quantitative because of the variation in yield per acre. For small areas, however, this is not very important, and the map is too elaborate for construction over big areas.

For very small areas, however, such a field survey provides a most stimulating school exercise. In our country, of course, its cadre would be the 6 in. ordnance map. For the uninitiated, we must state that this map is contoured and shows field boundaries. It is difficult to conceive of a more useful instrument in the hands of a capable teacher. It adds a new joy to trespassing! With its straight-sided fields the science of arithmetic becomes an outdoor game. It is an invaluable aid to the initial study of contours and of typical land forms. In addition to all this—and returning to our subject—the actual fields may be traversed map in hand, and each marked with an appropriate crop symbol. The relation between the nature of the soil and the use made of the land can be studied.

If the local schools of adjacent districts were to undertake such work in a systematic way, useful combined maps of very considerable areas could be easily produced and reduced. County education authorities might well father such a scheme, stipulating such uniformity of technique as would make combination possible, limiting their jurisdiction to the mapping of certain major crops, but otherwise entirely avoiding any encroachment upon that liberty of initiative as precious to every good teacher as to every child of nature.

An example of a very simplified field survey appears in Fig. 1. The map was constructed to show the influence of geological structure (and consequent outcrop soils) upon agriculture, in a small selected area. The map is reduced from the 6 in. The fields are grouped only into arable, permanent grass, woodland, and wooded down. It will be seen that in this instance there happens to be a complete correlation between the outcrop and the use made of the land.

Outcrop Belt.	Use of Land.
Upper Greensand. Here a very light sandy poor soil, sometimes covered with gravel patches.	Very little arable. Gorse. Common. Woodland with conifers. Dry grass land.
Gault. A heavy clay. Difficult to drain.	Permanent wet pasture. Some marsh land. Oak copses. No arable.

Upper Greensand. Sandy soil with much limestone admixture.	All arable for a very long and very narrow strip of good agricultural land at the base of the downs.
Lower Chalk. The most impure of the chalk layers. Contains some sand and clay.	
Middle and Upper Chalk. Almost pure chalk, with no drift cover in this part of the downs.	Sheep pasture.

From the point of view of map technique all such maps are reduction maps simply. They represent directly an actual state of affairs without the intervention of calculation based on production and unit area figures.

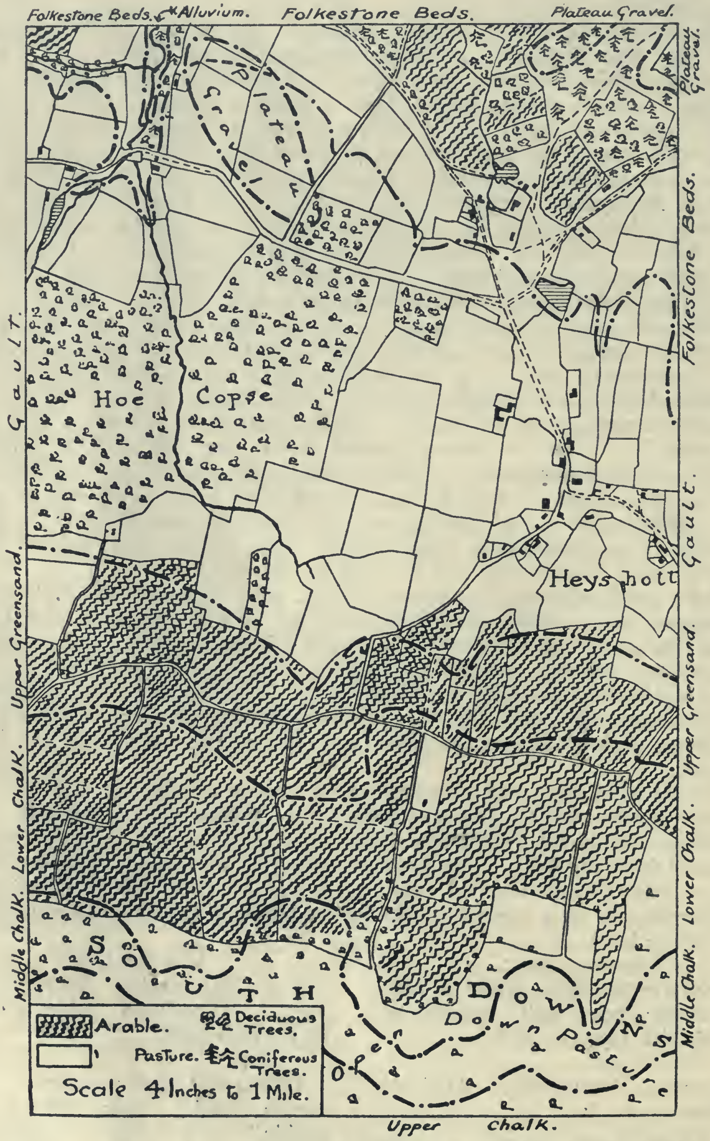
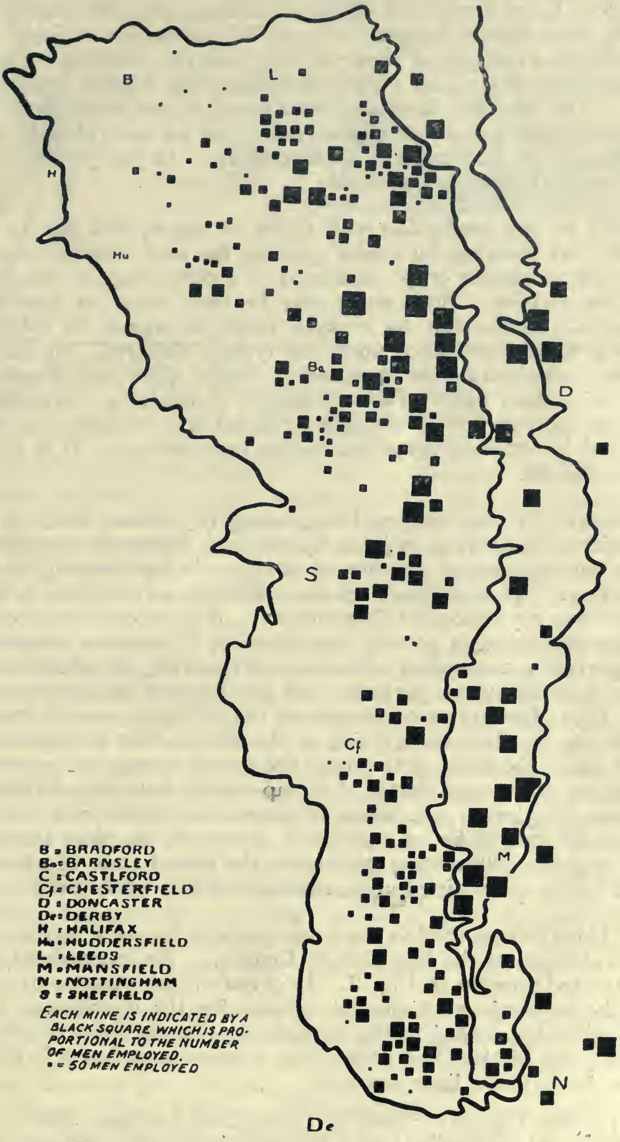


Fig. 1.—Simplified Field Survey by Students of the Geography Department, London School of Economics.



Each mine is indicated by a black square, the size of which is proportional to the number of men employed. The closed line on the west indicates the area representing this field as shown on most elementary maps, i.e., it represents the outcrop of coal-measures. The irregular strip to the east is the outcrop of magnesian limestone, and east of this again is the Trias Plain. These formations all dip to the east.

FIG. 3.—THE YORKSHIRE, DERBYSHIRE, AND NOTTINGHAMSHIRE COAL-FIELD.

For very large areas very different methods must be employed. These all involve crop density figures for each administrative division considered, the quantitative grouping of these figures, and the marking in some way of each administrative area on a map to indicate the density group to which it belongs. The method is one which every school child would follow for himself, and needs no further explanation. As we have already pointed out, the significance of such maps is in inverse ratio to the general size of the units for which figures are available.

A form of this production map much in vogue, and one to be guarded against, is that showing by colour grading for each administrative division, the area under a certain crop considered as a percentage of the total cropped area of that division. Such maps may be very useful as showing environments specially favourable to certain crops, or again, as indicating sometimes too great a dependence upon one type of culture ; but obviously they cannot be substituted for production maps pure and simple, otherwise hundreds of square miles of desert might simulate a maximum of productivity on the strength of a single irrigated acre of some one crop ! The official mind is peculiarly attached to this type of map. It is frequently the only one available.

A noteworthy variation on the grading (by colour tint, or shading) of the administrative area, is to place on the map within the boundaries of each such area an appropriate number of dots, each representing a definite unit of production. This method has some distinct advantages. These partly arise from our psychological deficiencies. If an area is covered with some even tint representing a certain crop density, it requires almost a mental effort to prevent a conception of the crop as covering the whole area—however thinly ! A small matter perhaps, and one avoided in a moment's thought, yet the Unit Dot system overcomes the difficulty, and, further, it is not difficult to choose the average size of the dot so that it approximately does represent (upon the scale of the map) the actual crop area concerned. There is the further advantage that if the map-maker has, say, 100 dots to insert in some one (too large) area which he knows to exhibit very varying physical conditions, he can, if he be sufficiently informed, so place them within this area as to give really a truer picture of the actual state of affairs than that conveyed by an even distribution throughout the whole area.

The Unit Dot method is used successfully for very large areas in the agricultural maps of the last U.S.A. Census. An example of a very large area so treated appears in Fig. 2. It is not all the purpose of this article to go into the physical and historical reasons for the distribution there shown, but the writer has added to the map three simple lines which indicate the nature of some of the chief controlling factors, and has left the correlation to the reader. These lines are :—

(i) (See Fig. 2.) Limit of Laurentian Archæan Shield. An area of old crystalline, glacier-stripped country occupying the N.E. quadrant of North America. Naturally forested, rugged, difficult and expensive to clear, and of soils generally inferior to those of the prairie lands.

(ii) Approximate line of average of 130 days above 60° F. for a year.

(iii) Line of 10 in. precipitation.

The western limit is formed by the foothills of the Rocky Mountains.

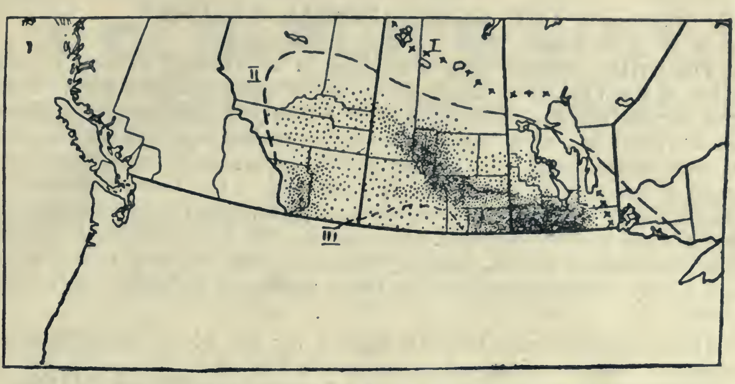


Fig 2.—Wheat Density Map of Western Canada.
I. x x x Limit of Laurentian Shield.
II. — — — Line of 130 days above 60° F.
III. - - - 10 in. Precipitation.
Each dot represents 5,000 acres.

§5. There remains the case of mineral production. At present almost the only maps available are those based upon the geological outcrop maps, and we have already noted that the usual coal-field map is little guide to reserves and none to production. The case of iron is worse. The normal iron ore maps of the U.S.A. and Sweden would suggest that the Lake Superior and Lapland ores are the least important in their respective countries.

For minerals we have a new difficulty in map technique in that we are dealing with a point production rather than an area production. In the case of a crop it is possible to mark the map area which actually represents the area covered by a particular crop. Obviously this cannot be done for mineral production, though if the administrative areas for which figures are available are sufficiently small, one may imagine the production spread over the whole area and adopt the same methods as for crops with significant results. Thus in the U.S.A., official figures for counties exist, and in the eastern coal-fields these counties are small enough to indicate very clearly (when tinted for production density) the eastern edge production of the Appalachian field, and the basin rim production of the Illinois field.

The writer suggests that a useful method of mapping (say, for a coal-field) is to put the outcropping measures in with a light tint, as also the proved concealed measures, and upon this to indicate quantitatively the areas of actual present production.

With regard to this last, probably the best convention, when it can be followed, is to mark each pit with a dot proportional to its production. This assumes a map showing by names the pits actually working, and a list of output figures for each pit. Neither are available in this country. One can get the Government List of Mines, and also a List of Mines which have been closed. Both would be useful documents if accompanied by maps. Some railway companies have pit maps. They are not complete, and they are private documents. A few trade journal maps are available, but these constantly get out of date, and they are not complete.

As for ordnance maps, they cannot be constantly revised, and half the pits shown are no longer in use. Half the pits working are not shown. Those shown are often not named! It is no use looking at the name of the nearest village. The pit is as likely to bear the name of a manager's inamorata, or of a Derby winner! And when you have tracked down the pit there are no production figures forthcoming, save those dealing probably with small areas in scattered, incomplete, and semi-private publications.

The writer realised these difficulties in an attempt to map the coal production of the Yorkshire, Derbyshire, and Nottinghamshire field. Eventually mines accounting for more than 90 per cent. of the men employed were placed. Figures and actual production were lacking, and so the production dots were made roughly proportional to the number of men employed underground at each pit (which figure is published in the List of Mines). One is quite aware that the two figures, production and men employed underground, are not at all strictly proportional, even on the same coal-field. Variations in the thickness of seams, in everything included in the term mining accessibility, partly account for this, but other and more technical matters are concerned.

However, they were the only figures for the whole coal-field which were available. The resulting map appears in Fig. 3. The enclosed western area is the outcrop area shown on all elementary atlases. Little coal is raised in the extreme west of this, where the measures are denuded save for the relatively barren lowest series. Yet it was here, south of Bradford and west of Leeds, or again in the narrow converging valleys west of Sheffield, that the typical industries of West Yorkshire developed rapidly in the early nineteenth century, for the streams of these hilly regions were of sufficient gradient to be used for power. And with the growing use of coal the outcropping seams of these deeply dissected western valleys were, at first, and before the development of mining engineering, more available than the thicker and richer but deeper seams to the east. To the east of the coal measure outcrop the productive measures dip (more regularly than in most of our coal-fields) under newer rocks, and since 1850 a gradual extension of the coal-mining area to the east has occurred. The largest, deepest, and most productive mines are now working through the Trias as well as the Magnesian Limestone in the east of the field.

The writer estimates that about one-tenth of the pits actually working are situated to the east of the coal-field as marked in the usual atlas, but that these produce more than one-third of the total coal raised in the field. They are large, deep collieries, employing more than 1,000 men each, and working chiefly the Barnsley seam at depths between 2,000 to 3,000 feet.

§6. Finally, we come to the fundamental question of the provision of statistics. These will not be collected by Government with the set purpose of making maps. On the other hand, all the statistics collected should be available to the public, and surely, in all countries, the four or five chief crops and the two or three chief minerals should be regularly and adequately mapped.

To deny this is to deny to the ordinary citizen the simplest information with regard to facts of fundamental political significance. To take the case of our own country: in the view of the writer it should be the business of the Board of Agriculture to issue, at regular periods (say, 5 or 10 years), production maps based on parish figures, and of the Department of Mines to issue production maps on a pit output basis. It is probable that this could be done without any addition to the already existing machinery engaged in the collection of statistics. It could probably be done without one single addition to the staff. If these maps were made on a convenient scale—say, by counties on a ¼ in. scale, and showing nothing but the production—the school circulation alone would probably pay for the publication costs. The writer is not suggesting for one moment that there should be any official attempt on such maps to relate the production to the physical conditions prevailing in various areas. This can be done most effectively and most economically by outside investigators, but these must rely on Government figures or on bare production maps based on such figures.

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Ceylon Geographical Association.

In spite of many difficulties, the Ceylon Geographical Association has accomplished some remarkable work in 1921. Many branches have been formed at suitable centres in the island. Mr V. T. S. Sivagurunathan, Hon. Sec. and Treasurer, sends us the report of the Colombo Branch. This branch is specially fortunate in that Mr L. MacDonald Robison is lecturer in geography at Colombo University College, and all those who know him will realise what a source of strength his energy and enthusiasm in the cause of geographical education must be. The branch also owes much to the zeal of its chairman, the Rev. Father Le Goc, and its honorary secretary, Mr Sivagurunathan. In addition to a varied and practical course of lectures, other helpful activities such as a general conference of geography teachers, a short course of vacation geography, co-operation with the Department of Education in drawing up schemes for work in schools and for mapping, help given in Civil Service courses, have been successfully carried out by the Ceylon group. We offer them our heartiest congratulations on their educational enterprise, and our sincere good wishes for continued success in 1922.

Note on Vegetation Maps of London Area.

During the years preceding the war some members of the North London Branch of the Geographical Association were occupied with a survey of the area north of London in order to discover what agricultural use was made of the fields and open spaces. No account was taken of gardens, but all other land was surveyed. The method adopted was to visit the fields in the spring and early summer and see what was being grown, the facts being plotted on 6 inch to the mile maps on the spot. Some 16 sheets had been completed when the war interrupted the work—partly because it was unsafe for anyone to be seen using a map out of doors. It is rather unfortunate that many of the areas surveyed are not contiguous, but as it happens eight of the sheets form a fairly solid block, and it has been thought well to publish some of the results obtained in this area.

It must be remembered that different areas were surveyed in different years, so that the results plotted on different sheets are not strictly comparable, but it is obvious that the general results are in no way invalidated by this.

Figure 1 shows the areas given up to grass and hay. It is seen that practically the whole area not occupied by buildings is a grassland and that a good proportion of this is used for hay.

Figure 2 shows (a) the fields in which at the time of the survey cattle or sheep were grazing, and (b) fields cultivated in any way, i.e., it includes market gardens and allotments. The extraordinarily small area so utilised is very striking.

It may be suggested that surveys of this and similar kinds might be undertaken by branches with great profit to themselves and the advancement of geography.

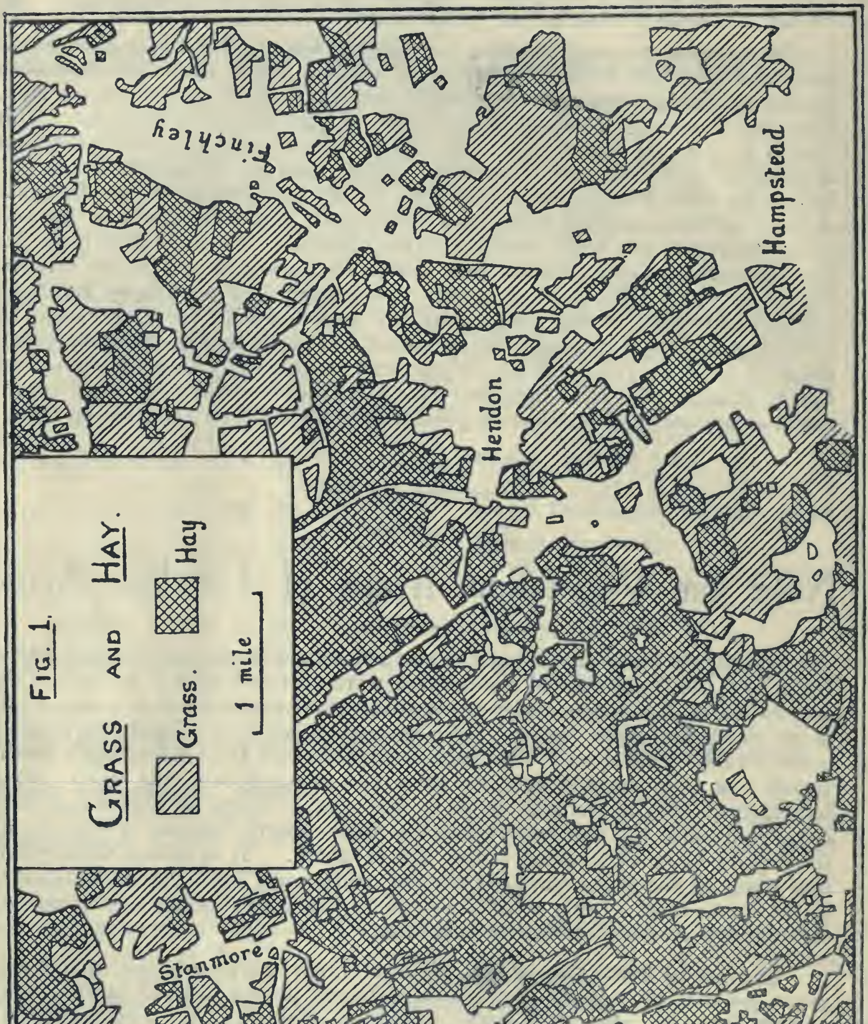

FIG. 1. GRASS AND HAY.

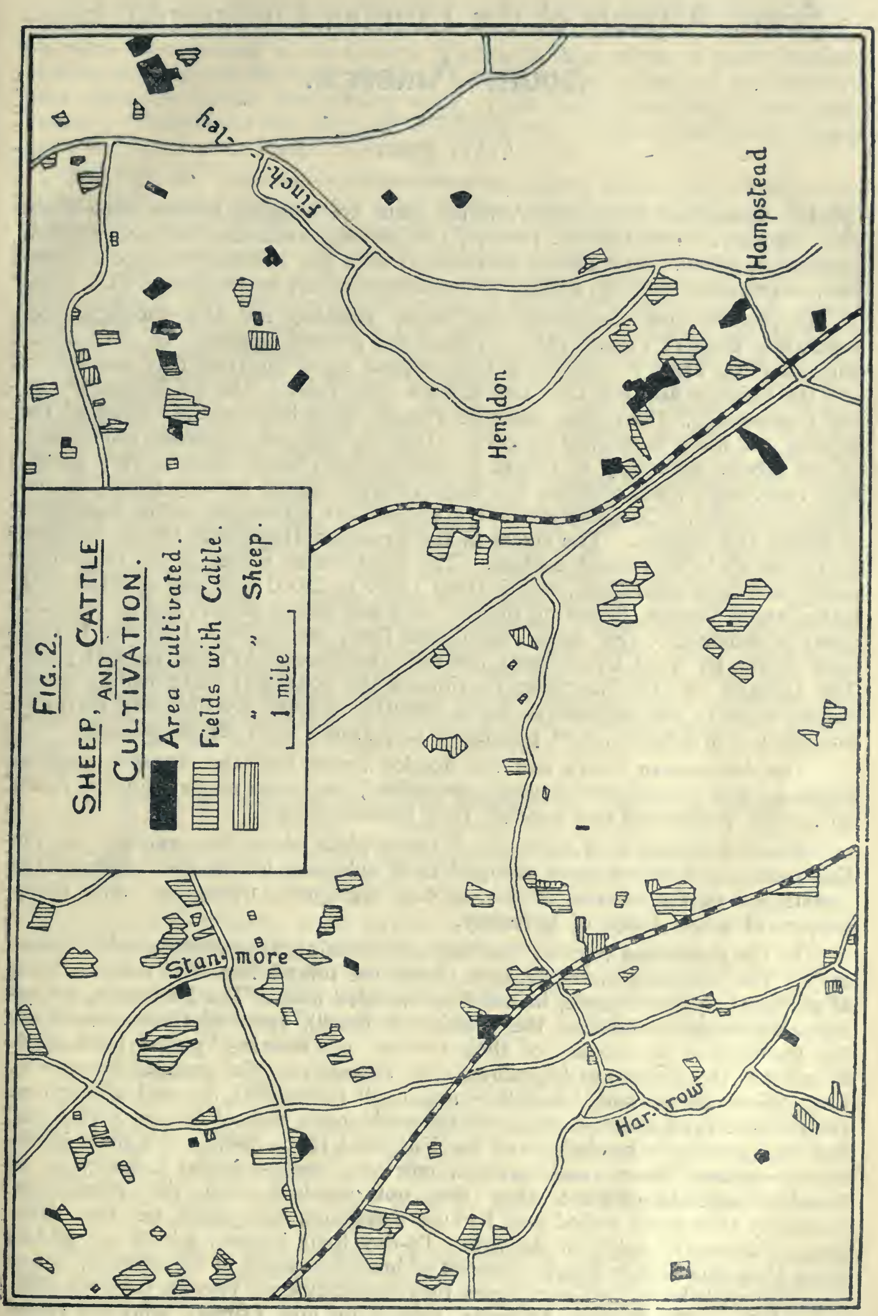

FIG. 2.

SHEEP, CATTLE AND CULTIVATION.

Some Aspects of the Human Geography of South America.

J. W. Page.

THE Continent of South America can be roughly divided into three regions :—The tropical forests, the great grasslands, and the western mountains, which to an extent correspond with the areas of manioc cultivation, of guanaco hunting, and of intensive agriculture respectively. (11, p. 9.)

In the first, the conditions are more suitable for the production of vegetation than of human life. The dense growth appears to crowd out both man and beast ; the few natives depend upon the fruit they can collect and the animals and fish they can kill for their food ; the air is hot, moist, and depressing ; thus these forested regions have become the refuge of the weaker and more backward peoples. True agriculture is almost impossible, as the labour necessary to create a clearing with stone axes is very great, and, moreover, when a space has been cleared, plants quickly grow up and choke the crops. Conditions of life are even less favourable in the highlands of Brazil and Guiana. The rivers of the Brazilian Highlands are so impeded by rapids as to be almost useless. The intervening plateaux are frequently sandy and arid moorlands, rising from 1,000 to 2,000 feet and covered with tufted grass, bushes, flowering plants, cacti and dwarf palms, and so the food quest is difficult. On these highlands lived the Tapuya Indians, having been driven by Tupi tribes from the more bounteous Atlantic coastal plain. The Indians of the northern portion of the continent were rather short, nomad hunters and collectors, wary, stealthy, almost invisible and certainly inaudible in the forest, and peculiarly acquainted with forest poisons.

The Amazonian rivers and the flooded areas cut the country up into sections, and a confederacy was impossible ; so soon as two hordes could no longer understand one another they became foes.

Many migrations of tribes have taken place since the coming of the Europeans, and others have changed their customs, but in the depths of the forests and in the interior of the eastern highlands there are still many peoples at a low stage of savagery.

In the equatorial regions clothing and housing are not absolutely necessary. The Cashibo, of the Ucayali, roam the forests like wild beasts, living almost entirely upon game, in which is included man. The Botocudo, a Ges-speaking people inhabiting the interior of Brazil, received their name from the Portuguese on account of their custom of wearing plugs (botoques). Some of the Botocudo (Aymoros) call themselves Nac-nanuk, Nac-poruc, i.e., " Sons of the soil," and they are in all probability the real aborigines. On the one hand their skulls recall the prehistoric race of Lagoa Santa, and the living subjects remind us of the Fuegians (2 p. 564). All their implements—spears, bows and arrows, mortars, water-vessels, bags—were of wood or vegetable fibres ; they had not reached even the stone age. Formerly they went naked and had no dwellings, but slept on the damp ground or on the ashes of the fire. To-day their houses, which are seldom more than four feet in height, consist of branches stuck in the ground, bound together with bast, and sometimes they accommodate two or more families (5 p. 418). The Caribs, Arawaks, Ges, Tupi and Trumai, who live round the upper Xingu, in spite of their diversity of race and language, have similar manners and customs.

The best type of house in the forest is rectangular in shape, with a ridge-roof covered with leaves or grass; the ends and sides are left open, but on the more open ground of the Guiana Highlands thick walls of mud are built in order to keep out the cold winds at night. Many houses are occupied by more than one family, and among some tribes there are large communal houses. Hammocks are used by several tribes, those of the Caribs being made of plaited palm leaves (2 p. 535).

Many of the tribes now wear cotton garments which they obtain from Europeans, but in the far west some of the natives may have learnt the art of weaving from the more advanced Indians of the mountains, who are described in the sequel. The scanty clothing of the more backward peoples, even to-day, is made of bark or the plaited fibres of various palms, etc. Necklaces and other ornaments are made of jaguars' teeth and claws, seeds, wing cases of beetles, etc., while the Botocudo wear necklaces of the teeth of those they have devoured. Their hunting weapons are the bow and the blowgun, but the former is rare in the upper Amazon, where the spear and throwing stick are more common. Only one hand is required for spear-throwing, and so the left hand is free to steer the boat (8 p. 34). The bows are beautifully finished, while the points of the arrows are made of reed, and are poisoned with curare—chip stone or flint heads not being used, as in North America. The blow pipes are often of great length, and much skill is exhibited in making them; their darts are eight to ten inches in length, pointed at one end, which is poisoned, and at the other end is a wisp of cotton from the bombax, etc. The darts are carried in a quiver made of plaited reeds or of bamboo. Stone axes, clubs and spears, in addition to the weapons already mentioned, are used in warfare. The clubs are usually of hard dark red-wood, short, flat and squared at the upper end. Wooden or plaited shields were used in warfare for defence. Thus we see that hut, dress, ornaments, and weapons are all made of forest products, while fire was obtained by rubbing one stick on another, but the cannibal Boro and Witoto living between the Isca and Yapura are ignorant of any methods of making fire (5 p. 414).

The Arawaks appear to have been amongst the first to undertake cultivation in addition to hunting. They grew manioc from which cassava is made, and, as with other primitive peoples, the work of planting was left to the women. Manioc cultivation is one of the easiest means of changing hunters to agriculturists, but its easy production tends to keep agriculture in a backward condition, many natives preferring a monotonous diet of fish and farinha to the trouble of planting sugar, coffee, cacao, and fruit. Moreover, manioc exhausts the soil so rapidly that the nomadic life of the hunter must be continued. Besides, the easy work, together with the fact that the prepared meal will keep three years, tends to prevent organisation into powerful groups (10 p. 197).

No attempt to group equatorial American peoples according to physical characteristics has so far been successful, and ethnologists have been compelled to fall back upon the less satisfactory method of languages. Roughly speaking, north of the Amazon the natives are Caribs and Arawaks, and to the south Tupi-Guarani and Ges. Haddon has shown how both the Caribs and the Tupi tribes, being water peoples, generally followed the course of rivers in their wanderings (3p. 109).

South of 30° S. the character of the country changes. To the west of the Parana is the rolling wooded country of the Gran Chaco, which is intersected by great rivers. It has a mild climate and abounds in fish and game. The rich pasturage of the Chaco passes on the south into the treeless Pampas, which south of the Negro merges into the plateau of Patagonia, much of which is almost desert and at its best is only scrubland. America of herself was without horses, sheep, and cattle, and moreover, there was no wheat, barley, or oats. The absence of cattle meant no milk, which to a great extent restricted the size of the families, and as there were no beasts of burden, the Indian was bound to travel light, and as babies had to be carried, this again limited the number of children. There were plenty of guanaco, the wild form of the llama, and of ostriches (Rhea), and these were hunted by the natives, who stalked their game, creeping within shot with bows and flint arrows, often getting quite close, by pushing in front of them the disguised skins of guanaco and ostriches (Rhea). The hunters' home was a tent made of a framework of poles covered with skins ; their clothes were of hides or skins. Their weapons were wood and stone, and the bow strings were generally made of sinews or strips of hide. Some of the tribes used skin shields.

Some tribes have been exterminated and others have been pressed by the white peoples into inhospitable regions, while the introduction of the horse entirely changed their mode of life. Even in the Gran Chaco considerable modification was induced by European influence, and there only remain hybridised descendants of many of the ancient peoples. A few miles from the Andes not a stone is to be found on the Chaco, and although there are plains, the sling cannot be used except as a toy, while implements are made of wood, bone, shells, etc. The majority of the Chaco tribes build round and longish, low brush-wood huts, and as their houses are narrow, and at times cold winds blow, hammocks are not used, the natives sleeping on the ground or on skins, or even on the cloak they use as a garment. The Choroti and Ashuslay are pre-eminently collectors of wild fruits and fishers, but they have learnt, probably from the Arawaks, to cultivate the soil, while the wooden spade appears to have been copied from the more civilized tribes of the mountains. Their chief weapon is the bow and arrow, bolas and slings being used as toys only, owing to the absence of stones. The bows come to a point, and are without notches for the string, which is often made of strips of skin or of sinews ; they have no shields. The tribes of the Chaco wear big mantles or blankets of home woven woollen material, having learnt the art of weaving from the west. Fur cloaks, which were worn with the fur inside, are disappearing ; the country is too hot, and there are too many insects, but they are useful when the cold winds blow. Cloaks are still worn, however, by the old people of both sexes, who are reluctant to give up an old custom. Ponchoes—a square piece of cloth with a hole for the head—are sometimes worn. The poncho appears to have been evolved from the cloak, and when the sides of a poncho are sewn together, excepting for a space for the arms, it becomes a sleeveless shirt. Wooden spoons and knives were formerly used, and many of the iron knives now in use resemble in shape the old wooden ones. The sharp toothed jaw of the palometa was used as a knife wherever it could be obtained. Grain was pounded with wooden pestles in mortars of wood, and manioc was ground on graters made of a piece of palm wood on which splinters of wood had been fixed. In North-west Argentina lived the Calchaqui, with dwellings and tombs of faced stone, for Tucuman was once in the Inca Empire.

The Puelche (cast men) was the collective name given to the pampas tribes. They despised agriculture, and lived by hunting, their chief weapon being the bolas. The bolas consists of a cord or thong, at each end of which is a stone ball, either tied to the thong by means of a groove in its surface, or else sewn up in leather. Sometimes the cord is doubled for half its distance, and has thus two balls at one end. In this case the third ball is smaller, and is held in the hand when the missile is thrown. Their home consisted of a portable skin tent.

South of the Rio Negro the ethnology is more simple. Here, at the time of the discovery, wandered small groups of nomad hunters, a tall round-headed race, known as Tehuelche, or Chuelche of the Araucanians, who appear to be related to the Bororo (5, p. 415), an unclassified tribe scattered between the upper Parana and Paraguay, and famed for their great bows and for being the tallest Indians in the tropics (about six feet). The Patagonians call themselves Tshunhi, and there are now about 2,000 of them. They are well developed, and have remarkable powers of walking and of abstaining from food. Their dress is entirely of skin, and their abode a skin tent. According to Joyce, there is no mention of their use of the bolas before 1776 (4, p. 247).

The Onas of East Fuegia are probably Tehuelche, who have migrated southwards, but the real aborigines are the Akalufs and Yahgans ; the former live in the west, and the latter in the centre of Fuegia. According to Deniker, the Akalufs are now reduced to 200, and the Yahgans no longer exist as an independent tribe (2, p. 574). The former appear to be the last representatives of the original long-headed race, whose remains are found scattered over the southern part of the continent (4, p. 218). The Fuegians are one of the most backward peoples in the world, the result, no doubt, of living in an inhospitable land which has a cold, damp climate, and in being almost cut off from the rest of the world. It is too damp to obtain fire by the friction of rubbing or drilling wood, and so it is produced by striking together two pieces of pyrites. They live by fishing and hunting guanaco, and for the former purpose have bark or wood canoes, in which they always keep a fire burning. Their chief food consists of molluscs and fish ; the former are eaten raw, and the latter are usually fried or stewed. When meat can be obtained it is also eaten raw. Originally the Fuegians wore very little clothing, notwithstanding the severity of the climate ; in some cases it was only a piece of guanaco skin, which they moved round their bodies according to the direction of the wind. Necklaces of bones and shells are worn, and the head is decorated with a feather crown. Their weapons are spears and harpoons headed with bone, and they possess a sling for killing birds, and they use also bows and arrows. Their bow is plain with a string of sinews, and to-day their arrows are generally tipped with glass.

To the south of the river Maule, in what is now the Republic of Chile, lived the Araucanians, who were never conquered either by the Incas or by the Spaniards. Their ethnology is complicated, as there were many migrations of peoples from the pampas into the country, and it was probably from these the Araucanians obtained their bravery and love of individual freedom and equality, which were so characteristic of their social system, that was mainly patriarchal. It was only in times of national warfare that the tribes united under a war-chief. The invaders came without their wives, and took unto themselves Araucanian women, and so it was only natural that their offspring should speak the language of their mother. In the north and more fertile region the Araucanian carried on a rude form of agriculture, and they were certainly acquainted with maize and potatoes (4, p. 221). Where the Araucans practised agriculture under conditions of marked alternation of sun and rain, they were settled and lived in small huts, but further south, where they were chiefly hunters, their home was a tent. At the time of the conquest, the strip of coast to the south of Tarapaca was inhabited by primitive fishing and hunting folk (4, p. 219).

Man progresses best where he is compelled to take thought for the morrow, so long as there is time to spare for the evolution of ideas. The adoption of agriculture and its accompanying settled life generally provides such conditions. He must study the seasons, and as the population increases, must widen the area under cultivation. The latter often means extending to drier regions and the consequent rise of irrigation. There is no land exactly like Egypt or Mesopotamia in the New World, and as we have already seen, there were no grains similar to those which helped to produce the advanced civilizations of the Old World. There was, however, maize, which had been cultivated for such a long period that the wild plants from which it had been developed were with difficulty identified. Maize was especially suitable to attract primitive agriculture. Its gigantic size limits the number of plants that can come to maturity in a given space, and thus it could be planted much in the same way as roots, while the smaller cereals cannot be profitably grown without some means of reducing the entire surface of the seed-plot to a state of tilth, and this meant great labour, and could only be pursued on an adequate scale by the aid of the plough and of the large labouring animals. America, as we have already seen, was without the horse and the ox at the discovery, and the tillage of the soil had to be accomplished by the unaided labour of man, a narrow wooden or bronze spade being the most advanced agricultural implement. The ease with which this unrivalled corn was produced placed cereal agriculture within reach of man at an early stage of development, while the large returns it yielded greatly stimulated its cultivation.

Across the coast-plain of what is now Peru run many rivers, fed by the melting of Andean snow, and in their fertile valleys crops could be grown and the cultivated area could be extended by means of irrigation. This had happened in the valley of the Chuacama long before the rise of the great empire in the Andes, and probably several thousand years ago. The Chimu people, who lived in the valley, were famed for their pottery, which by its modelling and drawing show how long ago in Peru there existed an artistic sensitive race. Their beautifully fashioned water vessels had either long or twisted necks so as to prevent evaporation, which was great in their arid country. The Chimu wore elaborate clothing, were well governed, and were law-abiding. When invaded by the Incas they offered a stubborn resistance, but in the end their wonderful engineering works proved their downfall. The aqueducts were too long to be adequately guarded, and eventually the sources of their water supply were seized, and they had to surrender or starve (4, p. 95).

It was, however, in the mountains that the most famous of the civilizations of the Indians arose. Here it was cool, and the natives were compelled to clothe themselves ; those in the south had in course of time produced the llama and alpaca from the guanaco, and they had discovered how to spin and weave. In addition they had produced the potato from a hard tuber not much larger than a filbert, and they grew maize. The absence of wood meant that houses were built of stone, and that the sling was much more common than the bow. In the northern Andes are beautiful ravines which often open out into fertile and protected valleys of such width as often to form great plains between the mountains, and although snow falls, it only remains on the higher parts. It was in such places that the Indians progressed, thanks to cultivation of maize and potatoes. The most important in the sixteenth century were the Incas of Peru. Joyce distinguishes four cultural centres in Colombia, and of these the Quimbaya were the most skilled gold-workers in the continent, while the Chibcha or Muisca, who lived to the east of the river Magdalena, had attained a political development far in advance of the rest of the Colombians. The chiefs of the Chibcha are all absolute monarchs, and the Spaniards were aided by the fact that civil war was raging between the north and the south. In Peru, the Incas were preceded by other somewhat civilized peoples. Remains of their handiwork, however, are seen in the wonderful ruins scattered about the region of lake Titicaca. When one looks at these ruins one marvels at the ingenuity of the people who managed to get large blocks of stone up the mountains without a beast of burden, and one is forced to conclude that they had many slaves. Tiahuanaco, at an altitude of 13,000 feet, shows the remains of a great city built by highly skilled masons. The famous megalithic doorway is elaborately carved, the central figure apparently representing the deity. The end of the Pre-Inca is said to have been brought about by an invasion from the south, when the king was killed in the Collao, north of Titicaca. Some authorities believe that the Incas have descended from these Pre-Incas.

At first the Inca empire was small, but was gradually extended until wiped out by the treachery of Pizarro. At its greatest extent it stretched from near Quito to the Rio Maule, a distance of 2,500 miles, and in one part had a width of 400 miles. It comprised what is now Ecuador, Peru, Bolivia, and considerable parts of Chile and Argentina, having an area of approximately 1,000,000 square miles and a population of 10,000,000. The Incas built palaces, temples, roads across mountains, bridges, aqueducts, and irrigation canals. They worked great alluvial gold mines, and obtained silver, lead, and copper ores from the mountains. The ores they smelted, and they made excellent copper tools. Woollen garments, blankets, mats, hats, and shoes were manufactured, and they had pottery of beautiful workmanship. Besides this, the Incas possessed a great knowledge of astronomy and arithmetic. They made and played instruments of hollow reeds, and composed songs recounting the deeds of their ancestors ; they had not, however, discovered the art of writing, but kept elaborate records by means of quipus (coloured strings with knots). In the last days of the empire the word Inca was reserved for members of the blood royal, the people being known as Quichua. Cuzco was their capital. " The despotic authority of the Incas was the basis of government ; that authority was founded on the religious respect yielded to the descendant of the sun and supported by a skilfully combined hierarchy " (12, p. 438).

When the Incas conquered new territory, like the Romans, they often transported the conquered people to another part of their empire, replacing them with others whom they knew to be thoroughly loyal to themselves. This to some extent accounts for the displacement of tribes, and has often led to errors (5, p. 169). To an extent the culture of the Incas spread to the neighbouring but less civilized tribes, and Nordenskiöld in his recent work has shown that the Choroti and Ashuslay of the Chaco have adopted cultivated plants, tools, clubs, woode nknives, spoons, poncho, shirts, games, looms, etc., from the mountain civilization (8, p. 236 and 237). Prof. Elliott Smith (13) has recently argued for culture contacts with the East across the Pacific as a factor of the origins of pre-Inca civilization ; his views are still under discussion.

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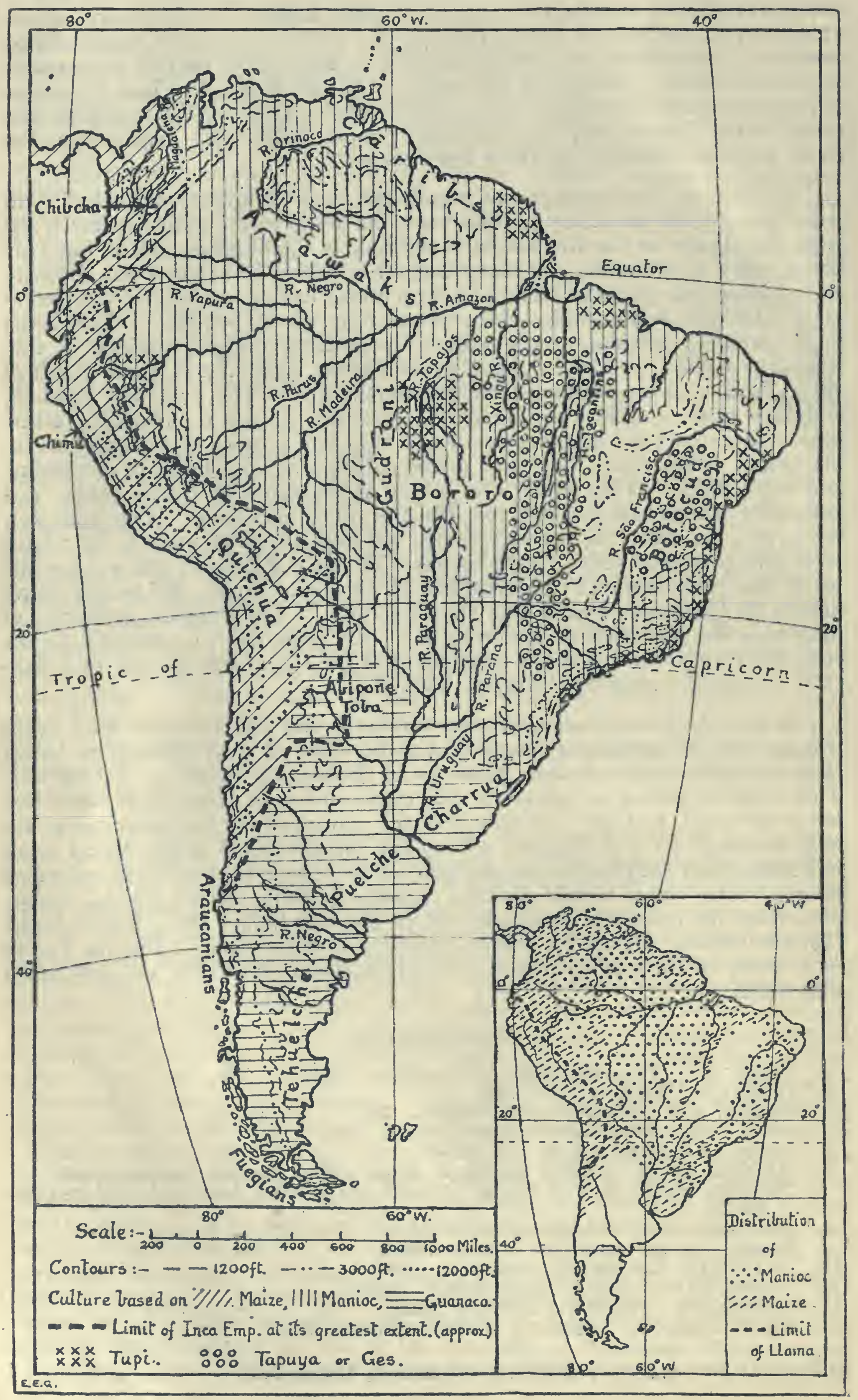
80°
60° W.
40°
Chibcha
R. Magdalena
R. Orinoco
Arawaks
Caribs
Equator
R. Negro
R. Yapura
R. Amazon
R. Purus
R. Madeira
R. Tapajos
R. Xingu
R. Tocantins
Guarani
Bororo
Chimu
R. São Francisco
Botocudo
Quichua
R. Paraguay
R. Parana
Tropic of Capricorn
Abipone
Toba
R. Uruguay
Charrua
Puelche
Araucanians
R. Negro
Tehuelche
Fuegians
0°
20°
40°
Scale:- 200 0 200 400 600 800 1000 Miles.
Contours :- 1200ft. 3000ft. 12000ft.
Culture based on Maize, Manioc, Guanaco.
Limit of Inca Emp. at its greatest extent. (approx)
Tupi. Tapuya or Ges.
E.E.G.
80°
60°
40° W
0°
20°
40°
80°
60° W
Distribution of
Manioc
Maize
Limit of Llama

A Survey of English Place-names.

PROFESSOR A. MAWER.

DURING the last half century scholars both at home and abroad have gradually become aware of the importance of place-name material as an aid in the solution and illustration of some of the greatest of our problems in language, history, and culture generally. Abroad this has led to the production of much valuable work, not only by individual scholars, but also by bodies of scholars organised for the purpose of making complete surveys of the material of their own countries. In England also much has been done, and the result has been a number of monographs dealing with various counties and one book on the place-names of England and Wales as a whole.

From the first those who have been working in this way in England have been increasingly conscious that their work could be but imperfect and tentative, as the names of their own particular area could only be interpreted aright in the light of the collected evidence for the whole of England. Further, they have felt how necessary it was, if there was to be any finality of interpretation, that the material should be worked upon not only by experts in several languages, but also by historians, topographers, and other specialists qualified to handle the varied aspects of this many-sided subject.

It is clear that neither of these difficulties can ever be fully overcome by scholars working single-handed and in more or less isolated fashion. This was realised and set forth very clearly by Dr. J. H. Round some twenty years ago in a paper in which he pleaded for a systematic survey of our place-names. Some twelve months ago the idea was revived in a paper read before the British Academy, in which the present condition of English place-name study was set forth and an appeal was made for an inquiry into the need for such a survey. After enquiry by an expert committee under the chairmanship of Dr. Henry Bradley, the Academy gave its cordial approval and encouragement to the idea of such a survey, and a scheme for such is now in being. The plans for it have received the approval and in many cases the active support of distinguished linguists, historians, archivists, topographers and others, both at home and abroad, interested in various aspects of place-name study. Members of the Geographical Association will be interested to know that among these no one has been from the very outset more cordial than the Director General of the Ordnance Survey.

One of the chief features of the Survey will be the endeavour to secure on the one hand that no meaning is suggested for a place-name which contradicts the topographical facts of its situation, and on the other to find wherever possible such definite information as to topographical facts as may enable those who are determining the meaning of a doubtful name to decide whether the name may be actually descriptive of the lie of the ground to which it is applied. These considerations have not been taken into account in the past to the extent to which they ought to have been. The failure to do so has, in part at least, been due to a genuine difficulty in finding the essential facts. Maps, however good, cannot tell the place-name student everything he wants to know. Some curious natural feature, some remarkable outline of shape, to be seen perhaps from one position alone, may have struck the imagination of the settler who first saw it and given rise to the name which the place still bears, and yet not be of the kind or size which finds record on the map. In detecting how far names which seem to be significant in this way are so in reality and describe some actual feature of the landscape, students of place-names need the aid of those who not only know the country, but also have an eye for country. What exactly is the natural feature which has led to the association of O.E. BEORG, meaning 'hill' or 'barrow' with first elements meaning ‘ broken,’ ‘ hollow,’ ‘ cloven,’ and ‘ seat ’ in Brokenborough (Wilts), Holboroughs (Kent), Clannaborough (Devon), Sadberge (Durham), Sedbergh and Sedbury (Yorks), Sedborough (Devon)? In what sense is the epithet HAMBLE-, HUMBLE-, HOMIL- from earlier HAMEL or HUMEL, meaning ‘ mutilated,’ applied to the shape of the hills so called? Why is Burshill, Yorks, earlier BRISTHILL, thus called the ‘ burst ’ hill? Topographical considerations may at times settle the question of an etymology where alternative solutions offer themselves. In some place-names it is difficult to know whether the first element in a place-name goes back to O.E. GREAT, ‘ great ’ or GREOT, ‘ gravel.’ What is the nature of the soil at such places? The names Quarndon (Devon), Quarrendon (Bucks), and Quorndon (Leic.) seem to contain as their two elements O.E. CWEORN and DUN and to mean ‘ millstone hill.’ Could such have ever been quarried here? There has been a good deal of discussion whether certain names in OVER such as Bolsover contain as their second element O.E. HOFER, or hump or swelling or OFER, shore or bank. Topographical investigation should settle a good many of these cases. There are a good many place-names in STON(E) or STONES. Does this refer to some prominent rock as in Spindleston (Nthb.), or to some ancient boundary stone or stones as in Fourstones in the same county?

This last name suggests further that often it will be well if our topographer has an eye not only for the work of nature in shaping the contours of the country-side, but also for the hand of man in the form of barrows, tumuli, mote-hills, and ancient earthworks. All these may find their reflection in place-names in such elements as -BERG(H), -BURGH, -BOROUGH, -BURY in suffixes or BUR- in prefixes s in the numerous Burfords, Burtons, Burleys and the like, or in Creech, Crich, Crick and the like, a term of Celtic origin used of barrows, etc. It is often quite impossible either on maps or in guide-books to find trace of quite important archæological remains of this kind, and yet again and again knowledge of them is essential if we are to understand a place-name aright.

Another very important matter is that of the rivers. River-names are often very difficult to get hold of, partly because the smaller ones are only named on the large scale maps and partly because owing to the angle at which their names have often to be read they are very easily overlooked. Now rivers are of the highest importance to the student of place-names because we are finding more and more that many of the cruces in place-nomenclature find their real solution in the fact that the village or town names are themselves old river-names, as in Wantage (Berks), Doulting (Somerset), Candover (Hants), or still more frequently contain river-names as their first element, as Tenbury (Hereford) on the Teme, Kintbury (Berks) on the Kennet, Pantfield (Essex) on the Pant. The position is complicated by the fact that many of the old river-names have now disappeared and that their place has often been taken by new names of quite modern formation often derived by a process of back-formation from the names of villages on their banks. Thus we can only find the true history of Bledington (Glouc.) on the Evenlode when we know that the old name of that river was BLADE, and may well go wrong in the history of Arundel on the Arun and Cambridge on the Cam unless we know that when these places were first so named the rivers on which they stand were called not ARUN and CAM, but TARENTE and GRANTA. The evidence of the present day map has thus to be checked and corrected by reference to ancient maps or documents which tell us the real age and form of the river-name, but that does not mean that the modern evidence is not of the highest importance.

At times, too, we need the aid of the geographer or even of the geologist in the solution of problems of a more general character. The suffix -HOE or HOO from O.E. HOHE dative of HOH, a heel, is found in ten per cent. of the place-names of Bedfordshire, a far higher proportion than anywhere else in England. This word is commonly explained as used in place-names of a spur of land thrusting itself out into the plain. If this is its meaning, does its frequency in this county point to any peculiarity of geological formation, or what is its explanation? Similar questions might be raised with regard to the great frequency of HOPE in the place-names of Shropshire and Herefordshire.

Lastly, in working at ancient documents we often find mention of place-names in a particular county which we want to identify. The task is at present very difficult owing to the lack of Gazetteers of a sufficiently detailed character which would enable us with comparative ease to find the modern equivalent of the ancient form, and many hours may be wasted in trying to track down a few forms.

These, then, are some of the problems of a topographical character which face those who are attempting this survey. How can members of the Geographical Association help in meeting them? There are many ways, but it is well to divide them into two distinct groups, viz., (1) methods of providing facts and information which need to be collected, checked, sorted and arranged, and then sent in for the general needs of the Survey, and (2) a means of providing answers to specific questions which may be raised by those who are gathering the linguistic evidence and interpreting it. This distinction is essential, for it is clear from what has been said above that topographical questions may often arise only when the old forms are known. The topographer alone would never suspect that Clannaborough may be a case of a ' cloven ' hill, or that Kirkley (Nthb.), older CREKKELAWE may contain a reference to an ancient ' crick ' or mote-hill.

For the first kind of information we need especially :—

(i.) Lists of the names for each county or other convenient area which are found on the 1in. or still better the 6in. ordnance map arranged in alphabetical order. The lists should state whether the name is that of a town, village, or other inhabited place or that of a natural feature, and if so, whether hill or river or anything else. If the place is not found in the Gazetteer or the P.O. Directory, some indication should be given of its position by giving the name of the parish or other district in which it is found, or better still, by stating its direction and distance from some better known place.

(ii.) Information supplementary to the above as to any curious natural feature, physical outline, or archæological remains which seem likely to have given rise to the names of the places associated with them.

(iii.) For every river-name a list of those inhabited places on or near it which seem to derive their names from it either as a whole or in part. Some or all of these names may have in the end to be rejected for any particular river in the light of the old names for either the river or the places on it, but in many cases they will be the means of suggesting for the first time possible connection between the two.

(iv.) Lists of ancient maps for any particular areas which need to be searched for old forms of its place-names and for old names which have now passed out of existence. These would be still more valuable if supplemented by actual lists of the names to be found on them with their modern equivalents if known, or, in the case of those that have now disappeared, some statement as to their ancient position. Two types of map call for special mention in this connection : (i.) Tithe Award maps, which often contain information of the greatest value ; (ii.) Early Ordnance maps and the like of areas now built over owing to the growth of modern industrial towns, in which it is often difficult to find the names and sites of places which were at one time of importance, but have now been entirely swallowed up.

(iv.) Records of local pronunciation of names, especially where these differ from that suggested by the spelling now in use. These are at the same time of the greatest value to the place-name student and most difficult to obtain. Their value is increased if recorded in phonetic script.

Material of this kind could be collected by individual members of the Association, or, still better, it could be gathered in organised fashion by members of a branch banded together for the purpose.

For the gathering of information of the second type, correspondents are needed in each county or other convenient area to whom the organisers of the Survey could address enquiries upon specific points, and who were themselves in touch with others who could make local investigations if necessary.

The Director of the Survey is Professor Mawer, of the University of Liverpool. He would be very glad to hear from individual members of the Association or from Branch Secretaries who would be willing to give help of any kind, however small, towards carrying out a work which needs every helper it can get. He would also be very glad to arrange as far as possible to visit himself or to arrange for others to visit branches which wished to hear more of the Survey and felt disposed to give it their support.

Topographers have had good reason to complain in the past of the neglect of an essential element in place-name study, in which they are peculiarly interested. Here we have a Survey of Place-names which places these questions in the forefront of its programme, and its organisers appeal with confidence to geographers to give them their aid.

The Senior Scientific Geography. By ELLIS W. HEATON. 874 pp., 5in. x 7¼in. Price . Published also in eight sections. Herbert Russell.

The first edition of this book was issued in 1910, and this (1921) is the sixth reprint. It was written for pupils and students up to the matriculation stage, and deals with regional geography largely from a geological standpoint, but not exclusively so, nor, in many areas, excessively so. The maps and diagrams are often very ingenious, and number in all, with some duplication, nearly 400, and give the book a pleasing individuality. The sections dealing with mathematical and physical geography are not over-condensed, and within the limits of the space available are good expositions of the several topics, particularly with reference to rivers and the geographical units of the continents; the least satisfactory is that dealing with local winds and their causes, on which much recent literature has been published, some of which with advantage might have been incorporated. Very few alterations in the book have been made during the several reprints, but the present volume has two appendices of seven pages in all of text, and six maps which set out a little of the new material required, but leave the reader with the impression that this part of the work was hurried, particularly in the second appendix, e.g., the misprints of fig. 61 for fig. 385 on p. 868 and of fig. 62 for fig. 387 on page 871 should be corrected, as they are very confusing at present. All the blemishes are only in small details, and the book as a whole still remains one of the best on the market. W.E.W.

Applied Geography. By ALEXANDER STEVENS. 309 pp., 4¾in. x 7¼in. Price 6/-. Blackie and Son.

This is a very good book and contains much that is not usually easily available. Written to meet the more elementary demands of the navigator, land surveyor, mining engineer and prospector, it is also a good example of what is meant by sound "practical geography" with special reference to the mathematical side, and the chief sections covered are figures and movements of the earth; map making and reading; charts; climate and weather; inland and ocean transport. Numerous maps and diagrams, exercises and solutions make the whole self-contained. The book is well printed, strongly bound, and is pleasing in appearance, and a rapid reading of it has led to the discovery of very few errors or ambiguities, but perhaps reference might be made to the contracted sentence on page 163, which leaves the reader in doubt as to whether 60° should precede 29° or follow 14½°, and a misprint in Fig. 88 of P for R makes the description rather difficult to follow. While all sections are well handled, special commendatory reference should be made to map projection, surveying appliances, and the notes on railways. W.E.W.

Leighton Park School, Reading.

SCHEME OF GEOGRAPHY.

A. S. Le Mare, Geography Master.

LEIGHTON Park School, Reading, is a Public School established by members of the Society of Friends for boys between the ages of twelve and nineteen, of whom there are at present a hundred and fourteen, all boarders. Geography is not taught in the Upper School except to certain boys in the Upper Fifth Form who are taking it as a subject for the Senior Cambridge Examination. In the Lower School it is taught in all forms, i.e., Lower Fifth, Upper and Lower Fourth, and Third. Boys in these forms are of ages ranging from twelve to seventeen years.

The basis of the work in each form is the study of some special region, but opportunities are sought for illustrating the universal occurrence and application of natural phenomena and physical laws. It should be added that it seems better to devote time to deal with one or two countries in a continent in considerable detail, especially in regard to their human and historical geography, rather than try to devote an equal time to all.

The Regional study is sub-divided as follows :—

1. Position and extent—world position, coast line and natural boundaries of the region studied.
2. Structure and relief—orographical, with reference to the geological and physiographical causes of land forms.
3. Climate—astronomical data, temperature, pressure, winds, rainfall.
4. Natural products—mineral wealth, vegetation, fauna.
5. Anthropological—racial types, human settlement, migrations.
6. Historical, political and economic ; discovery and exploration ; movement of peoples in the past ; growth of agriculture, industries and trade ; political boundaries ; sites of cities and communications ; present problems and probable future development.

In addition to the above, all forms do a considerable amount of practical geography and field work.

Details of Form Work.

The Third Form studies, in the first term, the local geography of Reading, Berkshire, and the Thames Basin, which in the two succeeding terms is expanded into a general survey of the British Isles. The text books used are " A Geography of the British Isles," by A. Morley Davis, and " The Surface of the Earth," by H. Pickles. The practical work includes map work on Berkshire and the Thams Basin, colouring contours, identifying tributary streams and sites of towns. A relief map is made by cutting out contours in cardboard and covering with plasticine, the regions chosen being the Thames valley from Lechlade to Windsor, showing the Cotswolds, Berkshire Downs, and Chilterns with the Goring Gap. Simple regional survey in the field, consisting of the insertion on sketch maps of the growing crops, main roads and railways, bridges, streams, etc.

Methods of determining cardinal points by sun and stars and magnetic compass ; simple approximations of latitude and longitude by the position of the mid-day sun.

Simple surveys by pacings and by chain and offsets.

The Lower Fourth Form studies Europe and Africa, special notice being taken of the climate and products of Mediterranean lands. A northern and southern continent are taken together in this and in higher forms, in order to illustrate the contrasted seasons of countries lying north and south of the equator. The Junior Oxford Geography has been used, together with Physiography by Huxley and Gregory.

Practical work in this form includes survey of a portion of the Park from a base line by plane table and the subsequent plotting of the survey, prismatic compass traverses of paths and roads.

Regional surveys ; relation of surface geology to soil and crops ; study of local land forms in Thames and Kennet Valleys.

The Upper Fourth studies Asia and Australia, and the Lower Fifth the Americas. Text books, World Studies and N. America, by Finch and Piggott.

In the Upper Fifth those boys who are taking the subject for examination do a course in World Geography, based upon Unstead and Taylor's General and Regional Geography.

These forms also do surveys by plane-table and prismatic compass, and contours by level and staff ; determination of latitude and longitude by sextant and transit instrument ; and construction of rainfall, temperature and pressure charts from a series of daily readings. Some cartography is done by Fifth Forms ; construction of map nets, e.g., Sanson-Flamsteed, Mollweide, Mercator, Simple Conic and Bonne ; these are discussed in class in relation to scale, and representation of area and shape, and compass direction.

The geography room is equipped with an astronomical model for illustrating the movements of sun, earth, and moon ; and an endeavour is made to keep the walls well lined with groups of pictures and picture post-cards illustrating the countries studied.

There is a small observatory in the grounds with five-inch equatorial telescope and a small transit instrument.

For meteorological observations there is a Stevenson screen containing wet and dry bulb, and maximum and minimum thermometers. A five-inch rain gauge is used and Fortin barometer with Vernier scale reading to ·001 inch, and on the school-house roof is a Campbell-Stokes Sunshine Recorder, and in the basement a Barograph and Micro-Barograph, which are in charge of one or more of the boys.

Longman's Geographical Series. Book 3. 613 pp., 7½in. x 5in. Price 7/6.

The new edition (1921) of this senior book contains the improvements and additions of the 1912 edition and some up-to-date material necessitated by the Peace Treaty. The printing, binding and illustrations (nearly 300 maps and diagrams—many of them coloured) are all beyond criticism, and the subject matter has been, on the whole, fairly well compiled, though the attempt to cover all branches of geography in about 600 pages seems at the outset to be an impossible task, and the excessive condensation may give rise to inaccurate ideas. This is particularly marked in the mathematical and physical sections (Fig. 43, for example, has long been discarded by modern workers, and the term "anti-trades" is incorrectly used in several places). Classification of mankind, map-making, and map-reading are almost valueless as they stand, while the sections on map projections contains both ambiguities and inaccuracies, and should be seriously modified before being used by the teacher. In short, the book would gain considerably by the elimination of the first 83 pages. The remainder of the book, which covers the political geography of the whole world, is very unequal, as only small parts of it have been revised. It still remains an anonymous production, and opinions are divided as to the value of books of this type, which is frankly somewhat in the nature of the old gazetteer text book. The numerous statistics might be valuable if kept up to date, and some attempt should have been made to make the book more readable, as it is certainly not very attractive to pupils in its present form; while there is a growing opinion that too much "cause and effect" is merely resulting in the memorising of "phrases" rather than of "places," yet this book gives too little scope for much other than memory work of a not very valuable type. W.E.W.

MACMILLAN'S LIST.

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A Text Book of European Archæology. R. A. S. MACALISTER. Vol. I. Palæolithic Period. 25 x 17.5 cm, vii. + 610 pp. Many illustrations. Cambridge University Press. 1921. 50/-.

Many parts of this book are very attractively written, and reveal the active mind of the well-known author. Nevertheless the reviewer who has just studied successively C. E. P. Brooks' papers on Climate, Burkitt's Prehistory, and Giuffrida Ruggeri on the Origin of Man, cannot but feel how much students would have gained had Burkitt and Macalister been able to co-operate with one another and with their Italian colleague as collaborator on the physical anthropological side, as well as with de Geer or Brooks to enrich the picture of the environments of early man. The differences of opinion between these authors are not such as could not be smoothed out to the great advantage of science by friendly discussion, and each of the two archæologists supplements the other usefully. Macalister often puts in a paragraph that tells the student just what he needs to learn in order to help him to thread the mazes of his subject, and Burkitt gives valuable catalogues of important sites. Neither treats the climates of the past very satisfactorily, though one is glad to see that both adopt Obermaier's view of the upper Palæolithic Age as a phase subsequent to the Würm Ice Age. Macalister has interesting criticisms of the skeletal remains claimed to be older than those of Neanderthal (Mousterian) man, but in dealing with the men of the upper Palæolithic he follows the unfortunate habit of using the term Cro-Magnon rather loosely, though with more discrimination than some authors. He is very appreciative of French research, though less completely under its influence than Burkitt. In dealing with man before the Chellean period, he takes up an attitude of scepticism, and his criticisms are often very sharp; Breuil would apparently allow a good deal more than Macalister is willing to concede. In the later part of the work, Macalister is far readier to make suggestions, some of which would doubtless be attacked fairly strongly by fellow-workers. The student who wants to know what Capsian, Azilian, Tardenoisian, Campignian, Maglemose and so on mean will find short statements and on the whole well-chosen illustrations, but he should at least also read Mr Peake's article on the Finns in the Journal of the Royal Anthropological Institute.

Both Burkitt's and Macalister's books fall short of meeting our great need of a synthesis of knowledge about early man, but that work, if it ever appears, will need to be syndicated under the guidance of an editor whom one could name were he disposed to undertake what must be a delicate task!

London and Westminster Contrasted.

A Study in the Effect of Geographical Influences on the Site and Development of Cities.

A Paper read before the Geographical Association.

[Members will be interested to know that Mrs. Ormsby's book on London is to appear in the Spring.]

IT is my object, in this paper, to give a brief geographical description of the sites of the ancient cities of London and Westminster ; to consider how far geographical influences had a part in determining these sites, and to what extent geographical conditions correspond to differences in their development.

Let me draw attention first to the essential features of relief as shown in the accompanying relief map of Greater London. They are :—

(1) The Flood Plain of the Thames.
(2) The Northern Plateau with its steep brink to the South.
(3) The Southern Plateau with a similar brink facing North.

The Flood Plain at London is a very definite feature. It has a width of between two and three miles, is everywhere less than twenty-five feet above Ordnance Datum, and in some places barely reaches five.

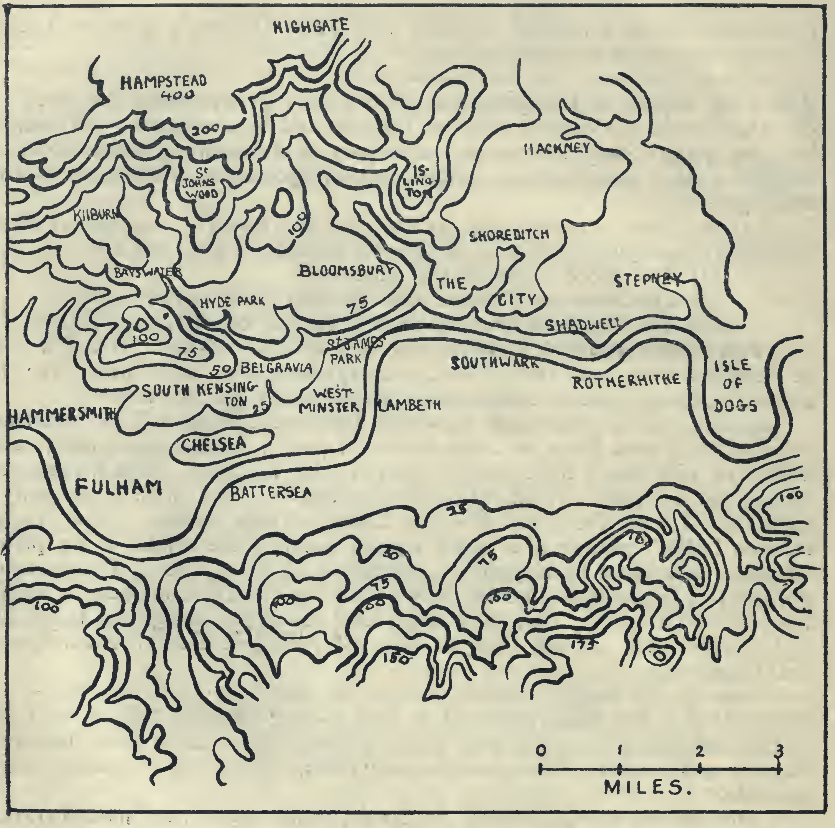
In our mental picture of "London before the Houses," we must conceive of the Flood Plain as a flat extent of peaty, water-logged land, raised a foot or two above high water, covered with a coarse, rank herbage and intersected by innumerable little winding creeks, filled with water only at high tide—for all the world like the Essex saltings to-day. For various reasons Loftie's picture of a broad lagoon washing the brinks of the plateau on either side must be abandoned, attractive as it may be. I cannot fully go into this interesting question here ; but the two main arguments against Loftie's idea are, first, that the Roman level to-day lies many feet below high water-mark, and, second, that we have no record of Roman embanking of the Thames.

Now it is hardly credible that, if the tide rose as high, relatively to the surface of the flood plain, as it does to-day, there should be no record of the embanking on a gigantic scale that must have taken place before the Roman settlements at Southwark and Westminster and Lambeth were possible.

This relatively high level of the flood plain may have been due (a) to the tide's rising less high, or (b) to a greater deposit of silt by the streams from the northern and southern heights, or (c) to the fact that water-logged peat occupies an astonishingly greater space than dry peat. All three factors may have been concerned, and it is interesting to note that embanking may have been responsible for two of them, for the greater the lateral restriction of the river by embanking, the greater would be the vertical rise of the water at flood, and the greater would be the shrinkage of the protected peatlands behind the embankments.

We have no record, as I have said, of early embankment at London and Southwark, and the probability is that the work was undertaken piecemeal and as the growth of population made it necessary.

The Northern Plateau. To the north the Flood Plain is sharply bounded by the brink of the plateau of London Clay, which slopes gradually up to the heights of Hampstead and Highgate. This plateau has been protected from rapid erosion by a covering of sand and gravel overlain here and there by stretches of fertile loam known to the geologists as Brickearth. Great store of underground water is held up in the sand and gravel by the dense underlying clay, hence we must picture to ourselves a multitude of spring-fed streams rioting all over the place, trenching deep valleys in the plateau and flowing, some direct to the Thames in broad estuarine mouths, some on to the flood plain, where their waters were dispersed in the marshy creeks and mingled with the tidal waters at the flood.



London. The Flood Plain and Northern and Southern Heights.

H. Ormsby.

The Southern Plateau rises to its greatest height more abruptly from the Flood Plain than the Northern one. Its summits are gravel-capped, too, but the whole area is more dissected and accidented than the gentler Northern slopes.

The Thames, in the earliest days of London, meandered as now, in great tidal curves from side to side of the plain that it had carved for itself, impinging now on the northern, now on the southern brink. The tributary streams entered on the outer curve of each meander, full, swift and clear, but bringing down a heavy load of silt after the rain to build up the land on the opposite shore.

Now we must imagine the heights to the north and south as being thickly wooded, with great forest trees on the clays and with scrub and thicket on the sands and gravels, and finally we must picture the river as considerably wider and shallower than it is to-day, for there were no embankments and encroachments of various kinds to narrow it and increase its scour. And so, I think, we have a fair picture of the place as the Romans found it.*

To the Romans, at first, the main consideration in regard to this area was to find a convenient crossing place for their road from the coast to Chester. Now, did they find it first at Westminster or at London? Mr R. C. Smith makes out an ingenious case in favour of Westminster in the Victoria County History, in which he shows that the convergence of Roman roads at Hyde Park Corner would necessitate a crossing at this spot. Let us see how the geographical conditions coincide with this theory.

From Shooter's Hill, to which the Watling Street has been traced, there would be little difficulty in carrying a causeway to the Lambeth shore. (Mr Smith's conscience seems to have jibbed at the idea of making the Romans diverge by a hair's breadth from the straight line, so he argues that the Isle of Dogs bend had not reached so far south at that time as it reaches to-day. Judging from records of borings, I should say that the contrary is the case, and that the land has encroached on the river considerably at that point, as elsewhere. I do not see that he need have worried; the Roman engineers were practical men, and we have no evidence that the following of a straight line without divergence was a religious cult with them).

I have already shown that the river must have been both wider and shallower before embanking took place. Even Elizabethan maps show the river, at Westminster particularly, considerably wider than it is now, and the fact that it flows here transversely across the flood plain in a straight reach with no steep banks, points to the likelihood of its having been fordable at this point.

About the middle of the straight reach just mentioned and on the west bank rose a sandy mound above the polder-land between two marshy creeks, similar to the gravel bank on which Chelsea stands. This mound seems to have been connected by a neck of slightly raised ground between the heads of the two creeks with the north bank of the Westbourne valley, along which runs the Edgeware Road, the modern representative of the Watling Street.

We see, then, that the geographical evidence at all events does not contradict the theory of the archæologist.

Of a Roman settlement at Westminster there are very few relics—a pavement in College Street, another in the Cloisters, Roman tiles built into the walls of the Abbey buildings. I think there is evidence enough, however, to form a not too fantastic picture of Roman Westminster—a broad stretch of sandy shore sloping up from the river between two broad creeks; at first, perhaps, a ford and later, doubtless, a wooden bridge crossing the shallow stream from the causeway on the southern side and connecting with the paved way that leads across the rising ground between the marshlands to climb the brink beyond. From this brink a clear rivulet, the Tyburn as it was later called, issues from its deep-cut, gravel-lined bed, bringing a plenteous supply of spring water from the Hampstead springs to mingle with the Thames water which, at the flood, creeps in innumerable sandy or peaty channels among the rank vegetation of the Flood Plain. Upon this low, sandy promontory, overlooking the river or its creeks, commanding the ford, ferry or bridge, rise the Roman villas, their gardens and orchards flourishing on the foot or two of alluvial soil that overlies the sand, supplied with water for bath and fountain from surface wells and from the Tyburn. Here and there among the creeks are dotted the huts of British fishermen, for the Thames was a rich salmon river before an increasing population polluted its waters.

City of London. Now let us turn east and study a very different site. At the northern end of the reach we have been considering the river takes a sharp bend to the east and washes the edge of the plateau. Three streams trench the plateau here in succession, one coming down from the northern heights and the other two rising in diluvial gravels of the lower plateau, all three plentifully and perennially supplied with water, cutting deep through

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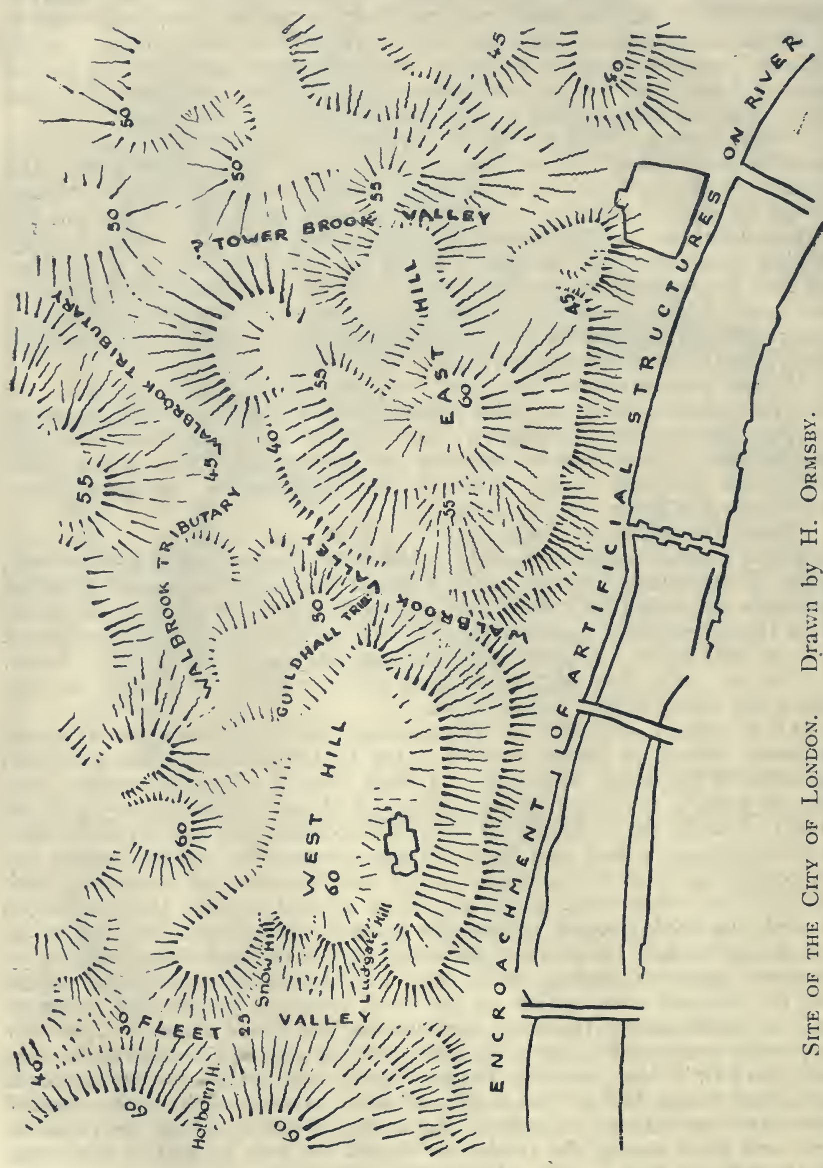
*Of a pre-Roman London there appears to be little evidence, either for or against.



Site of the City of London. Drawn by H. Ormsby. Approx. Scale 3½in. to 1 mile.

the gravel into the London Clay parts, and debouching into the Thames by broad estuaries. These streams and their tributaries have carved the plateau above the brink into two distinct hills, of which the western one has a steep descent on three sides and the eastern one on two. (Vide map ii.)

It is astonishing how much of the old relief of the City, as we know it from ancient maps and records, has survived, and how the contoured map showing present levels reveals features, some of them known to us historically, but hidden from our view by the accumulations of centuries.

To get at the old floor of the City we must remove twenty or thirty feet of made-earth from the valley bottoms and six to ten from the hill tops, and slice away some twenty yards of encroachment from the river bank.

The central stream, the Walbrook or Waelbroc, took its rise in the neighbourhood of Shoreditch, received a number of tributaries from east and west, and emptied its waters into the Thames at Dowgate just west of where Cannon Street Station now stands. Although the whole course of the Walbrook hardly exceeded a mile and a quarter, it brought down a large volume of water from the gravel, which, as we have seen, covers all the higher ground to this day.

To-day the tide is felt in the London Bridge sewer, which represents the Walbrook, as far as Lothbury. The mouth of the Walbrook was some three hundred yards across, and the bottom of the old bed has been discovered at depths of over thirty feet below the present surface. Its harbour was known as Dowgate.

The Turnmill brook or River of Wells, with its estuary the Fleet, formed the western boundary of the western hill, and had a course which can easily be traced to-day. Taking its rise far north of the City, it was able to maintain its flow to within comparatively recent times. We have maps which show its whole course, whereas no map shows the course of the Walbrook within the City. One can get some idea of the gorge that the Turnmill brook cut by standing on Holborn Viaduct and looking down on Farringdon Market, which lies above the old bed of the stream. Throughout its course the Turnmill brook, like the Walbrook, was fed by springs from the Valley Gravel, hence its other name, River of Wells.

About the middle of the eighteenth century there was still sufficient force in the current at Bagnigge Wells, near King's Cross, to turn the wheel of a snuff mill, and there was water enough in the Fleet to carry pleasure boats as late as 1700.

I am in some doubt as to the western boundary of the City site. The contours show a distinct trench which may be simply the remains of an artificially cut ditch, but was more probably originally the trench cut by a stream debouching into the Thames on the present site of the Tower. I have not yet sufficient records of borings and excavations to test this theory satisfactorily, but it is a fact that the old gate of Aldgate was built upon piles, which seems to bear out the idea.

Now these twin hills above the Thames, begirt with natural moats, offering protection from attack on all sides, with easy access by water, and a plentiful supply of clear water for drinking, with good fishing, pasture and forest in close proximity, offered an excellent site for a defensive position, as the Romans no doubt early discovered. There has been much argument among the antiquarians as to which hill, the eastern or the western, should have the honour of being the site of the Roman oppidum which preceded the City. For reasons which there is not space for in this brief study, the site has been located by recent authorities east of Walbrook along the edge of the brink overlooking the river. Everything south of Thames Street, we must remember, is an encroachment on the river. Possibly the Langbourne that Stow describes was the ditch that protected the northern wall.

Clustered about this citadel for protection there grew up, no doubt, a number of Roman and Romano-British dwellings. Many remains of Roman houses have been found, especially along the course of the streams, and very pleasant some of these sites must have been, beside the clear water running swiftly over its gravelly bed to the broad Thames-gardens with blossoming fruit trees, bubbling springs rising from the gravel, and away to the north wooded slopes with birch, hazel, oak, sweet chestnut, willow and alder, rising to the imposing little summits of Hampstead and Highgate.

Rapidly, under the security of the fort, a little trading settlement developed. A hundred years after Cæsar's invasion we find it a Roman post like Soissons or Bar-le-Duc, and, as Tacitus tells us, "though not distinguished by the name of colony, much frequented by a number of merchants and trading vessels."

Traffic passed up and down the river and up the Fleet and Walbrook till the time came when the population had spread over both hills, and for better security the Romans constructed the City Wall, probably about half-way through the fourth century. Map (ii.) shows how closely the Romans followed the natural lines of defence offered by the streams and their tributaries.

The Walbrook had to be carried through the wall by a culvert, and it was the neglect of this culvert in the dark period following the departure of the Romans that led to the formation of the great swamp that lay for generations to the north of the City and was called the Great Moor and later Moorfields. It was not drained till 1605.

For a century and a half after the withdrawal of the Romans from Britain in 457, there is unbroken silence regarding the history of London. Possibly London shared the fate of Verulam, Chester, and Wroxeter; possibly, as Sir Laurence Gomme maintained, and as the preservation of the British name might seem to indicate, the site was never wholly deserted. By 605 the Saxons were in full possession of the City, and we must suppose that she soon resumed her position as a trading mart on the Thames. Bede calls it "an emporium for many nations repairing to it by land and sea."

The building of the Roman bridge at London and the diversion of the Watling Street from Westminster through the City must have been detrimental to the trade of the former place, though Besant argues, not very convincingly, that Westminster continued to flourish as a trading centre despite her rival. At all events, after the Saxon conquest, Westminster did not recover her trade as London did, but fell into decay, her ruins gradually disappearing beneath the encroaching peat till the site became wild and lonely enough for a monkish settlement.

By the time of Sebert the Saxon, who is said to have founded the first monastery, the Roman bridge had long since disappeared, the Roman street was lost beneath the peat, the high road from London passed by to the north along the brink to join the dead end of the Watling Street at the site of the Marble Arch, all the merchandise unloaded at the wharves of Fleet and Dowgate. Westminster was side-tracked.

Nevertheless Thorney, as it came to be called from the thorn thicket that distinguished it from the surrounding marsh, provided all the requisites for monastery life—quiet, seclusion, good soil for kitchen gardens, rich pasture, plenty of food for fast days in the "fishfull river of Thames" and its creeks.

As a monastery, Westminster did not acquire much importance until Edward the Confessor, casting about for a site worthy of a monument that should record his great devotion, fixed upon Thorney, "for that it was near unto the famous and wealthy City of London and also had a pleasant situation among fruitful fields and green grounds lying round about it, with the principal river running hard by, bringing in from all parts of the World great variety of wares; and merchandise of all sorts to the City adjoining; but chiefly for love of the chief Apostle, whom he reverenced with a special and singular affection." So the Abbey was built out of a tenth of all his rents, regardless of cost.

With the rebuilding of the Abbey the royal patronage of Westminster became marked. Edward the Confessor made it his royal residence, the Conqueror had himself crowned there, and the patronage continued under the Norman kings. A geographer who is not an historian speaks with fear and trembling, but it seems pretty clear that the Norman rulers early conceived the hope of neutralising to some extent the power of the wealthy and, it must be confessed, at times truculent City of London, by increasing by every means in their power the prestige of Westminster.

William Rufus built the Great Hall at Westminster in 1097. In 1135 Paddington was added to Westminster. In 1204 the burden of repairing the road between the two cities was laid upon the citizens of London by King John. In 1216 the Court was definitely established in Westminster. In 1248 Henry III. ordered the holding of a three days' fair there to raise funds for the rebuilding of the Abbey. In 1256 it was ordained that a weekly market and an annual fair should be held there. London merchants were naturally incensed at being forced to migrate to Westminster, and preferred to pay a heavy fine rather than do so.

In Edward the First's reign a deliberate attempt to attract trade from London was made in the establishment of the Wool Staple at Westminster. This had a certain success. Wool was brought by land and water, and the London merchants were forced to take up parish duties and responsibilities there.

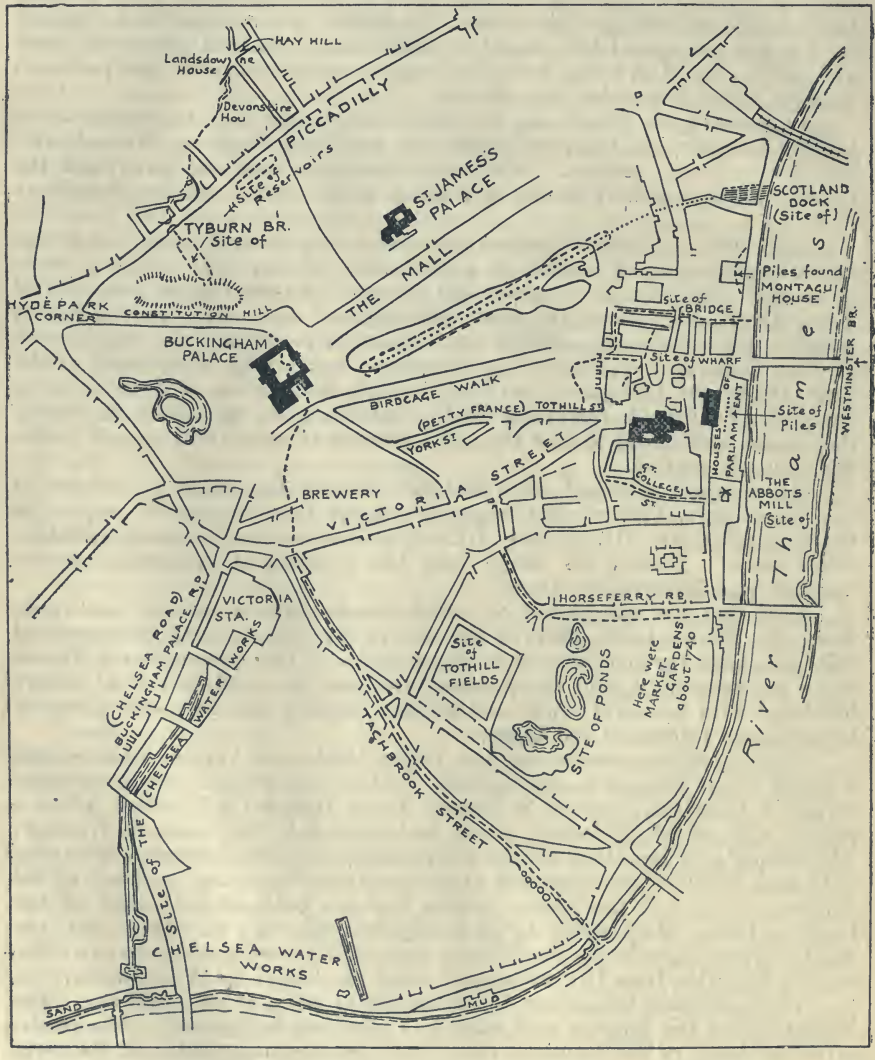
This effort at decentralisation was renewed again and again, but to the natural advantages of London as a port and market was added a trade momentum that was proof against all attack. Her deep water harbours of Fleet, Queenhithe, Dowgate and Billingsgate were well provided with wharves and warehouses, and the Easterlings, or merchants of Cologne, with all their important continental connections, were well established at the Steleyard beside Dowgate ; so that, though the citizens of London were annoyed, and though there was no love lost between them and the Abbot, they could well afford to lose the small amount of trade that passed to the Westminster market.

Nevertheless, although she could not vie with London as a commercial centre and port, Westminster began to acquire fame in another way. In the reign of Henry III. the Royal Court of Justice was permanently established there. Hubert de Burgh built him a palace at Whitehall, and his example was followed by others.

Note that the steep brink on which London stands extends westwards along the Thames to the north of the flats round Thorney, and the beauty of this site above the river was early appreciated. The famous Savoy Palace made its appearance, and was gradually followed by a whole row of stately buildings with beautiful lawns and gardens sloping to the water, mainly belonging to princes of the Church.

Then came the splendid reign of Henry VIII., and Westminster became a world centre of gaiety and fashion. Henry suppressed the monastery, created a bishopric, annexed St. James' Leper Hospital and turned it into a palace, and seized Whitehall, which had come into the hands of Wolsey. The Bishop's houses along the Strand passed to wealthy noblemen, who vied with each other in the splendour of their surroundings, and we read of the Thames . . . "the stately palaces that are built on both sides of her bank so thick, which made divers foreign ambassadors to affirm that the most glorious sight in the world (take water and land together) was to come upon a high tide from Gravesend and shoot the bridge to Westminster."

This quotation brings me to an important point in my subject. The importance of the Thames as a waterway must not be ignored. The roads, after the decay of the Roman streets, were outrageously bad, and the river became the highway for London and Westminster. The succession of stairs and water-gates can be seen on many of the old maps. This passenger traffic up and down and across the stream was largely fed from Westminster, but goods traffic to Westminster must have diminished steadily as the size of craft increased; for, in addition to disadvantage of her shelving shores and shallow creeks, London placed a heavy handicap in her way in the shape of the Bridge. Peter of Colechurch's bridge, with its twenty or so arches, its overhanging houses, its water-wheels and mills, became such an obstruction to the flow of the tide and thus to traffic, that it effectually prevented any development of merchant shipping above bridge; thus Queenhithe, which had at one time been the most flourishing of London harbours, was made inaccessible, to say nothing of Westminster.



So the Port of London began to develop down stream, and this, together with the establishment of the Court at Westminster and the settlement of the nobility along the Strand, was the beginning of an East and a West End at London.

The " Wen," as Cobbett viciously calls the Metropolis on every occasion, grew and grew, absorbing village after village in fact if not in name, and Westminster became at last no more than a dignified appendage of her commercial rival. (The dignity was recognised in her being allowed to retain the title of City among the London Boroughs.)

Now in this brief sketch I have tried to show how, in spite of all the royal and ecclesiastical efforts bv preferential treatment to give Westminster a separate existence, in spite of the prestige that accrued to her from being the seat of the Court, the High Court of Justice and the Parliament, the initial geographical advantages of the site of London gave that city such a start that nothing could check her development, and I think the situation is well summed up in the story quoted by Stow, which I will quote in conclusion :—

" When it was told an Alderman of London by one of Queen Mary's courtiers that the Queen, in her displeasure against London, had appointed to remove with the parliament and term to Oxford, this plain man demanded whether she meant also to divert the river of Thames from London, or no? and when the gentleman had answered ' No '; ' Then,' quoth the Alderman, ' by God's grace, we shall do well enough at London, whatsoever become of the term and parliament.' "

Sir Everard im Thurn has kindly sent the editor the following note on " Ancient Tales from Many Lands,"* by Miss R. M. Fleming, and it is given here for the interest of members of the Association.

Miss R. M. Fleming's " Ancient Tales from Many Lands " contains a selection of fascinating folk stories, which are roughly classified according to the stage of culture of the folk of whom they are told. In this way a number of extraordinarily vivid glimpses are given of how at different times and places men lived, long ago, of how they thought and of what steps they took to cope with the new emergencies which from time to time they had to face. Doubtless the book will greatly interest the grown up general reader ; but, as is explained in the preface by Professor Fleure and in the appendixes by Miss Fleming herself, its main purpose, admirably carried out, is to provide teachers with folk tales with which to catch the attention of children to whom they are told and at the same time—if the teacher is duly prepared and willing to explain—to educate the youthful audience in the real story, using that term in a very wide sense, of the world.

Anthropologists have recently clamoured for the better and wider education of the administrators and missionaries who go out from the home-land to care for the many and varied primitive folk now included in our Empire. Miss Fleming's book suggests—and seems to offer a means of following up the suggestion—that a much wider knowledge than is at present common of the places and people of the whole earth is also desirable for the teachers who stay at home.

But one almost trembles to think of the number and difficulty of the questions with which children of average intelligence to whom these stories are told will, or at any rate should, overwhelm the teller ; and one doubts whether any but the teacher who has had an exceptionally wide training will know the answer to even a moderate amount of these questions. Herein lies another merit of Miss Fleming's book—in that it should stimulate the wider education, in knowledge of the world, of the teacher as well as of the taught.

*" Ancient Tales from Many Lands." R. M. Fleming; with nine half-tone plates, 8¾in. x 5½in., pp. 159 + 34 pp. appendices and bibliography. Benn Bros. 10/6. 1922.

Miss Fleming alludes to "the Hebrew stories of the infancy of the world as having a beauty and an arresting simplicity which has never been surpassed"; and she suggests that the corresponding folk-tales which are being collected from almost every region of the world might be equally well used to reveal something of the history, geography and anthropology of those widely separated places, and so to give to our children, wherever they may be, some degree of sympathetic understanding of the people of the whole world.

While fully sympathising with this suggestion, the present writer feels impelled to interpolate a caution. This is that, even assuming that the teacher has the requisite knowledge, he or she should be very careful to give, as far as possible, the right explanation and answer to a question. The scene and surroundings of the old Hebrew tales are not so far away, not so unknown to us as many, if not most, of the scenes of many of the folk tales which might be most effectively used. Moreover, long use has accustomed us to the conventional understanding of what may be called the scenic background of the Hebrew dramas; but it is far more difficult both for teachers and pupils rightly to conceive the corresponding background of regions of which we have been less accustomed to hear.

However, Miss Fleming's suggestion and her present contribution towards bringing it into effect are most excellent. Upon the foundation which she has here supplied, historians, geographers, and above all, anthropologists, should be able gradually to bring together in easily assimilable form and in ever increasing masses information which would enable the teachers to answer the inevitable storm of questions.

One other thought suggested by Miss Fleming's book may here be recorded. During a considerable colonial experience in official positions, the present writer has often been confronted with the difficulty of finding suitable text-books—usually written from the English or some distinct point of view—for assimilation by children, say, in a tropical colony and without knowledge of any but tropical conditions. Attempts have more than once been made in some special colony to supply its own needs in this respect, but perhaps without meeting even that aim, certainly without producing a book, such as is needed, which would be intelligible to children whether in temperate or in tropical lands. The only approach to such a text-book seems to be the Bible, and its usefulness for this particular purpose depends largely on the fact already noted that the background before which we have come to see the drama played is of a conventional rather than a real kind. The question now arises whether the want might not be met once for all by a text-book of folk tales selected from different parts of the world, and carefully annotated. And this again suggests that in such a text-book the greatest care should be taken not to confuse the issue by the use of wrong stage properties. The only error of this kind detected in Miss Fleming's book is so absurdly small that it is the more useful as an illustration of this danger. It lies in the introduction, as the companions of Maui when in old New Zealand he went to seek out the goddess of death, of "the small robin and the large robin, the thrush and the yellow hammer, and every kind of little bird, and the water wagtail." It is true that these popular names of common English birds have been applied by European colonists to more or less similar birds in New Zealand; but it would be better not to induce the English child to think that such thrushes, yellow hammers, and water wagtails as he sees in English gardens and fields are to be found in New Zealand, and vice versa the New Zealand child should not be correspondingly misled.

EVERARD IM THURN.

U.S.A. Coast and Geodetic Survey Publications. I.

THE Department of Commerce of the United States of North America issues, from time to time, publications from various bureaus under its control, and many of these books and booklets are of great value to teachers of geography not only in U.S.A., but also, if the books were easily available, to teachers in other lands. For example, the Bureau of the Census is at present distributing bulletins relating to the Fourteenth Census (1920) on such topics as agriculture, mines and quarries, drainage, manufactures, etc., of various States. The Bureau of Fisheries has information available as to weights and values of catches in various areas at different times, and also prints other documents and economic circulars ranging over such a wide field as, e.g., Brine freezing of fish (No. 53); Methods of Cooking Haddock (No. 47); Recipes for using Canned Salmon (No. 48). The Bureau of Foreign and Domestic Commerce is responsible for weekly commerce reports and monthly summaries, and issues Miscellaneous and Special Agent series covering such topics as Swedish Forests, Handbooks of Paraguay, Norway and China, etc.—all with the most recent information. Other Bureaus deal with Lighthouses, Navigation, Standards. The last handles circulars, scientific and technologic papers on a great range of subjects, e.g., recent publications deal with such matters as: specification of black paint, microphotometers, enamels for sheet steel, wearing tests of shoe leather, platinum resistance thermometers, etc. All of the pamphlets are cheap, and for further particulars reference should be made to the Monthly List of Publications, on file in several libraries and other educational institutions in Britain.

The above literature will be of more particular value for various aspects of Economic Geography. Teachers and students interested in Mathematical Geography will find that the publications of the Coast and Geodetic Survey will make a special appeal to them, and as these booklets are not well known to many teachers, who nevertheless constantly feel the need for such material, some idea as to their contents is set out in the following notes. For convenience of classification the publications will be dealt with under the two main heads of (1) Cartography, including Map Projections, (2) Surveying, including Geodetic Surveying and instruments. [Those under the second heading will be described in the Geographical Teacher, Summer Number, 1922.] No special account will be given of the Marine Charts issued by the U.S.C. & G.S., which charts should not be confused with the Topographic Land Survey Maps issued by a different Department, to which reference may be made in a later number. A strictly limited number of the following publications are on free issue for selected institutions, but, in general, the source of supply is by purchase from the Superintendent of Documents, Government Printing Office, Washington, D.C., and for the convenience of the general public, five-cent coupons in sets of 20 for $1, obtainable at the same address, can be used in payment of small amounts. These coupons can be used at any time in exchange for U.S.A. Government documents.

The work of the U.S.C. & G.S. (Director: E. Lester Jones) is carried out under the superintendence of different Chiefs of Divisions, and W. Bowie is in charge of the Geodesy Division, with Charles H. Deetz as Cartographer and Oscar S. Adams as Mathematician and Geodetic Computer. These last two are the authors of the nine works noticed below.

CARTOGRAPHY AND MAP PROJECTION.

Perhaps the most useful general book yet to hand is Serial No. 146, Special Publication, No. 68, "Elements of Map Projection with applications to Map and Chart Construction," by Deetz and Adams, 1921; price, 50 cents, plus postage. This is a large book of 163 pp. ($7\frac{1}{2}$ by $11\frac{1}{2}$ inches), with eight folding plates and 74 figures in the text. At an inclusive charge somewhere in the neighbourhood of 3s. it represents a treatise sold at something substantially below the cost of production. The explanations of the principles underlying the theoretical side of map projection and also underlying the practical construction of networks are set out with extreme care. Simple language and the avoidance of complicated mathematical expressions, together with well drawn explanatory figures, will, at last, make the general reader believe that this essential part of geography is interesting, of practical importance, and within the grasp of the non-specialist. The book obviously owes something to the writings of Hinks and Reeves (incorrectly stated as Reaves—footnote, page 7), of Britain, but numerous other non-American authorities have been placed under contribution, while a large remaining balance represents the authors' own work.

After the general statement of the problems, there follows an analysis of the basic elements of map projections containing some original treatment and good practical hints as, e.g., in the setting out of the network on an initially plain globe. The next section gives some of the considerations involved in the representation of a sphere upon a plane, and is followed by an elementary discussion of the various more frequently used forms of projection. This is a particularly pleasing part of the book, the smallest item likely to present difficulty is slowly and patiently explained, and the illustrations prevent any possibility of error. If one compares the work here with the inaccurate material still being published in several Senior Modern Geography Text Books in Britain, one appreciates how well the authors have done their work. The majority of the network diagrams occur in this section, and they are all well drawn. Pupils will be amused at the diagrams showing relative distortions on page 51 (diagrams originally published, by the way, in Reeves' "Maps and Map Making," R.G.S., 1910, pp. 116, 117), and the point of importance here is that up to page 52 in Deetz's and Adams' book there is nothing beyond the easy grasp of a pupil in the lower middle form of a secondary school—there is nothing he should fail to understand from his own reading of the book and nothing to unlearn later, while if he never proceeded further he would be better equipped, in this section of the work, than appears to be the case at present with many of the top form geography pupils.

Part 2 analyses the Polyconic projection and then has something new, in its form, to say about such projections as Bonne's, Lambert's (with a reference to the Grid system of Military Mapping), Alber's, Mercator's (Normal and Transverse), Gnomic, Aitoff's, Mollweide's, and Guyou's. This Part 2 is admittedly more difficult, but most of it remains easy reading even to the non-mathematician, while the tables and short historical details interspersed from time to time make the book self-contained. The plates are worthy of special reference. The frontispiece shows lines of scale-error for four selected projections, and shows graphically several points which often still remain obscure in a text description. The folding plates (each about $11\frac{1}{2}$ by 19 inches) show North Atlantic on Lambert's Conformal Conic; North Pacific on Transverse Polyconic; U.S.A. on Alber's Equal Area; North America on a Gnomic; Aitoff's World; Goode's interpretation of an "interrupted" World Mollweide—a novel and useful map; Lambert's Zenithal Polar, and finally a projection devised by August and Bellerman showing a World (Orthomorphic) within a two-cusped epicycloid.

A very much smaller booklet, "A Study of Map Projections in General" (Serial 113, Special No. 60, 1919; by Adams; price, 5 cents; 24 pp.; 5 by 8 inches), contains a most useful summary of the matter. The construction formulæ of several of the projections are given, and there are Equal-area World networks on the Sinusoidal, Werner's, and Collignon's projections which are additional diagrams to those given in the larger book. There is also a Transverse Mollweide network designed by Close (though no acknowledgment is so made), which perhaps might have been redrawn with advantage if required for other than its original purpose ; the reason for the smudged appearance of the land masses in this reproduction of it will cause some preliminary thought and some subsequent amusement.

The other booklets are rather more technical than the above and deal rather with detailed mathematical analyses of selected projections or groups of projections than with general principles. The care exercised in their compilation and writing give them a special value for the advanced student. Several deal with the Conic Projections. Serial 110, Special No. 57, 1919 (" General Theory of Polyconic Projections " ; by Adams ; price, 25 cents ; 174 pp. ; 5 by 8 inches), has made some use of the writings of Tissot, Germain, Herz and Hendrickson, and is a fairly complete treatise on the polyconics, using the word in a broad sense, seeing that references are made to such networks as Lagrange's, Nicolosi's, Fournier's, and Lallemand's modified (as used in the 1 in a million International Map).

Lambert's projections have received consideration in five booklets. In order of date, they are : Serial 77, Special 47, 1918, " Lambert Conformal Conic with Two Standard Parallels " ; by Deetz ; price, 75 cents ; 60 pp.; 7 by 10 inches, with 7 folding plates. This includes interesting historical notes on the work of Lambert and has references to the French use of one of his projections for the 1914-18 battle-area maps ; the book also contains some comparisons of this projection with the Bonne and Polyconic Projections. Serial 82, Special 49, 1918 (by Deetz ; pp. 84 ; 7 by 10½ inches ; price, 15 cents) is really a supplement to the above and contains detailed projection tables. It was issued to facilitate the work of preparing maps of the battle areas, as the French tables, which were on a limited issue, were insufficient in number and unsuitable in their form for American use.

Serial 89, Special 52, 1918 (by Adams ; 243 pp. ; 5 by 8¼ inches ; price, 25 cents), is somewhat similar to Serial 82, but contains tables for plotting United States maps on the Lambert Conformal Conic with two standard parallels. It opens with a description of the projection and shows how to use the tables in setting out any particular U.S.A. network.

Serial 92, Special 53, 1918 (by Adams ; 38 pp. ; 5 by 8¼ inches ; price, 10 cents), is still further supplementary to Serials 77, 82, 89. It contains a short account of Lambert's life and work, and a few notes on projections in general, and then develops the mathematical theory controlling the calculation of the above tables.

Serial 143, Special 67, 1921 (by Adams ; 132 pp. ; 5 by 7¾ inches ; price, 20 cents), is a mathematical treatise on " Latitude Developments connected with Geodesy and Cartography." It includes Latitude Transformation Tables and a table for a Lambert's Zenithal Equivalent Projection with equator as map centre.

Serial 167, Special 75, 1921 (by Adams ; 39 pp. ; 6 by 9 inches ; price, 5 cents), has the title " Radio Compass Bearings," and its purpose is to assist in the plotting of such bearings both on the Gnomic and on the Mercator projections. The booklet is intended to be used in conjunction with three graphic charts (R1, R2, R3), issued separately, which make use of Mercator elements and with Great Circle Chart No. 1280 with Gnomic elements. The pamphlet is specialist in character, but resembles the others in being as simply set out as the topic allows.

WALLACE E. WHITEHOUSE.

A Revision of the Map of Natural Vegetation in South India.

HILDA A. WILCOX.

THE accompanying map showing the vegetation of Southern India has been prepared as far as possible from descriptions contained in the Imperial Gazetteer of India, and other sources, and an attempt has been made to map the vegetation of each district taluk by taluk as thus described. Where definite statements as to the exact vegetation of any area could not be found, the map was completed through argument by analogy with surrounding areas, taking account of temperature and rainfall.

The classification adopted has been chosen because to a large extent it shows the correspondence between vegetation and climatic belts. Thus the map shows the gradation from the wet, tropical forest of the west coast, with its heavy rainfall, to the scrub lands of the interior of the basin, with their great heat and long periods of drought. The basin-like character of the Deccan plateau, with a forested rim and more or less barren interior, is distinctly brought out.

If this map be compared with a map showing annual rainfall certain marked correlations will be noticed. The region of heaviest rainfall corresponds to the belt of wet forest along the west coast. The area of closely packed, parallel isohyets running north to south marks the narrow belt of monsoon forest on the eastern slope of the Western Ghats. The region of closed isohyets of 30, 25, and 20 inches occupying the central part of the basin is an area of grassland passing into scrub in the driest parts, only supporting trees where hill slopes face rain bringing winds.

A similar region in the south corresponds to a region of extreme poverty of vegetation. The east coast furnishes an excellent example of the dependence of forests upon a sufficient annual rainfall. No forest of monsoon type occurs where the annual rainfall is under 40 inches, and very little where the rainfall is between 40 and 50 inches. The belt of heavier annual rainfall in the north-west clearly marks out the Sal forest belt, with its grassland vegetation in rain shadow areas.

Although these striking similarities exist between the annual rainfall and vegetation, other facts suggest themselves when the season of rainfall is considered. According to the monthly rainfall maps in Bartholomew's Meteorological Atlas, the area of Sal forest has on the average six or seven months in the year when the rainfall is under one inch, while areas of scrub exist where there are only three or four months with under one inch of rain. Thus the map would seem to show that the total rainfall is the determining factor in the distribution of vegetation rather than the length of time over which that rainfall is distributed. Only a small area even of 'dry' forest occurs where the annual rainfall is under 30 inches.

It is obvious that there are regions which have apparently a sufficient rainfall to support forests, though they do not now do so. It seems probable, however, that the forest covered area of Southern India was at one time much larger than it is to-day, but forest fires, during the intensely hot period of drought, and shifting cultivation have considerably reduced the forests. Once removed it is extremely difficult for forests, growing under such conditions, to re-establish themselves. In many places where forests are known to have flourished the land is covered with a kind of scrub jungle.

Thus far we have considered only the general types of vegetation which the map shows, but the characteristics of each and the way each varies in different parts of Southern India must be considered. The natural vegetation of the west coast is a dense wet forest, mainly evergreen in character. This covers all the western slopes of the Ghats, which face the south-west monsoon, and receive everywhere a rainfall considerably over 100 inches. The highest timber is found in North Kanara and West Khandesh. Mango, terminalia and cocoanut rise above a dense undergrowth of tropical character. In places where the soil is not thick enough to support a high forest, jungles exist, and along the coast are tidal jungles and mangrove swamps. Here and there are patches of bare stony ground, as for example the small tracts of laterite in South Kanara and Malabar districts. Higher on the Ghats the forest is of a mixed character with teak, ain, blackwood, and anjam among its trees. Behind Bombay this mixed forest is very extensive.

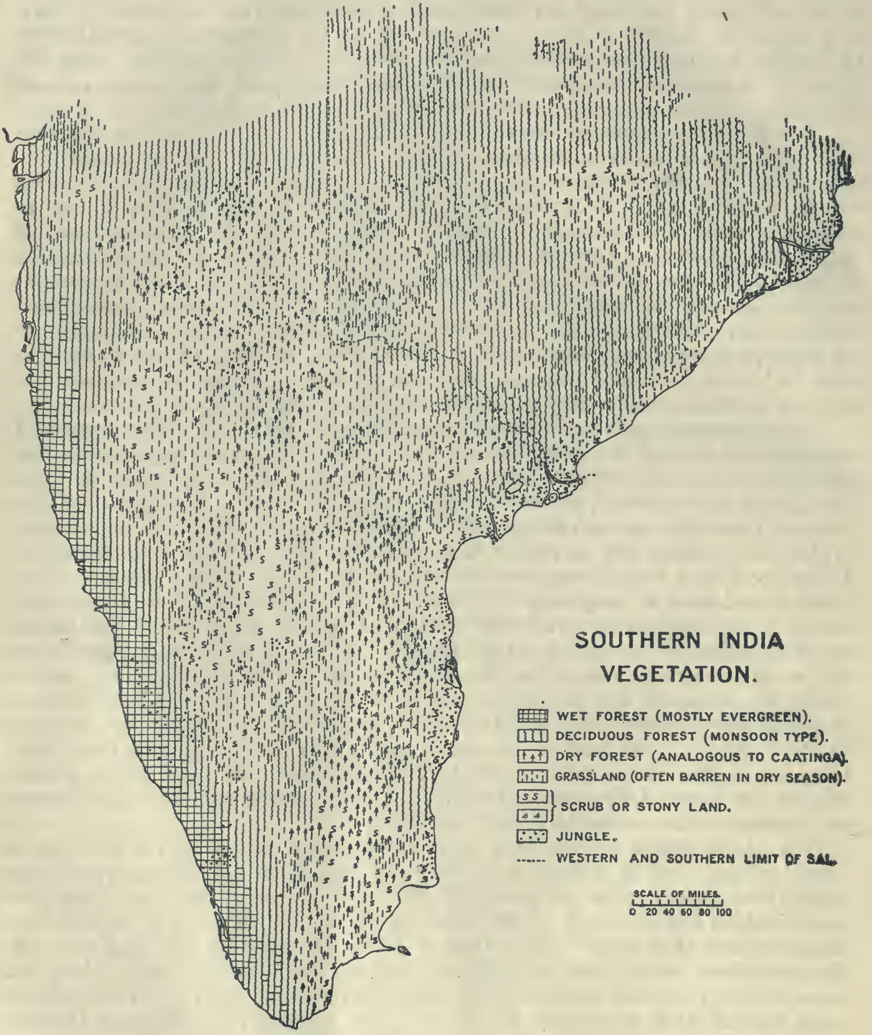
Gradually towards the north and east the forest loses its tropical character and becomes a deciduous forest, shedding its leaves in the dry season. The map shows a large area of this type of forest, but it varies much in character. It is, however, all monsoon forest, that is, it has to survive a more or less lengthy period of drought. On the eastern slopes of the Western Ghats, where the rainfall is over 50 inches, and the dry months comparatively few, is a forest of giant trees, containing teak, ironwood, sanders, sandal, rosewood and ebony. Malabar produces some of the finest Indian teak. The forests of Travancore are of unusual beauty, and in parts so dense as to be almost impenetrable. Here teak, bamboo, redwood, mango, wild jack and ironwood are common, and at least six species of palm are known, together with many plants of medicinal and economic value.

In the wetter parts of the deciduous forests there is a dense tangle of undergrowth during the rainy season, but as the dry season approaches this dies down. The forests of the Eastern Ghats and those of the north-west, though often very thick, do not produce very fine trees. The teak of the Eastern Ghats is poor and disappears towards the north, its place being taken by the sal. This tree covers a large belt in the Central Provinces, the Tributary States and Orissa, forests of pure sal being quite common. Sal is not found west of longitude 78° or south of the Godaveri. In Hyderabad many of the hills are covered with forests of sandal, teak, ebony and satinwood, but there is not much larger timber. Many of the river gorges, even in the drier regions, are quite heavily wooded. Dense monsoon forests clothe the slopes of the Satpuras. As a contrast to these are the Nilgiris, in which only the lower hills are forested. In Mysore the forests are confined to the ‘ Malnad,’ the land of mountain and forest in the west of the State. Here, as in the Ghats, the tops of the hills are bare. In some parts, especially in the Central Provinces, forests of pure bamboo are found, in others the bamboo forms an undergrowth for teak.

In places which receive less rain the monsoon forest gives place to a ‘ dry ’ forest. It is difficult to distinguish this from the drier parts of the former belt, but for the purposes of this map no forest has been classified as dry which has as much as 40 inches of rain. In most cases it has considerably less than this. This type of forest is found on the slopes of the Eastern Ghats which face the interior, and on the Deccan itself. Here the trees are very stunted and are often mixed with scrub jungle. Trees of the same species as in the monsoon forest are common, for example inferior teak, especially south of the Godaveri, but conspicuous among its trees are babul, acacia, tamarisk and tamarind. Once destroyed it seldom re-establishes itself.

Palmyra trees are very characteristic of the fringes of this belt, and are found scattered over the next belt, which, for want of a better term, has been called grassland. This description is certainly accurate in the wet season, but in the dry season the land is more like a dry, sandy desert, with the grass burnt brown in the great heat. Near the rivers, where the soil is moist, are groves of trees, and some favoured areas are open rolling country of parkland type. Patches of dry, often thorny, jungle are frequent. One of the worst parts of this grassland region is the south of Madras Presidency.

From Madura to Pamban in the dry season the land is like a desert with a few palmyra trees and prickly bushes. The same conditions occur, too, in the north of the Presidency and in the central part of the basin.


SOUTHERN INDIA VEGETATION.

WET FOREST (MOSTLY EVERGREEN).
DECIDUOUS FOREST (MONSOON TYPE).
DRY FOREST (ANALOGOUS TO CAATINGA).
GRASSLAND (OFTEN BARREN IN DRY SEASON).
SCRUB OR STONY LAND.
JUNGLE.
WESTERN AND SOUTHERN LIMIT OF SAL.
SCALE OF MILES
0 20 40 60 80 100

In places there are areas where either the land is stony or conditions are so bad that the land remains barren or covered only with scrub. In addition to considerable areas of this type on the Deccan itself, much of the eastern coast is of this character. The coasts of Tinnevelly and Madura, which are sheltered from the monsoon, are one long sandy waste. Around the mouths of the Cauvery with its heavier rainfall are salt swamps and thick jungle. Scrub, with patches of jungle, succeed this for the greater part of the coast northwards, the jungle becoming thicker and less dry around the river mouths. Mangrove swamps in the tidal areas occur, as on the west coast. The jungles often provide firewood, as for example the Casuarina jungle between Pulicat Lake and the sea.

North of the Godaveri the forest comes much nearer to the coast, and these forest-covered hills are interspersed with areas of bison grass. The mixture of forest and grass recalls the ' sholas ' of the Nilgiris, though here the grass is of shorter growth.

The same mark has been used to indicate jungle throughout the map, but it varies from the evergreen jungle of the west to the thorny jungle characteristic of the most inhospitable regions.

Draft Programme for Spring Meetings

OF THE GEOGRAPHICAL ASSOCIATION IN YORKSHIRE, APRIL 20TH—22ND, 1922.

THURSDAY, APRIL 20th. **3 p.m.** Council Meeting, Board Room, University, Leeds.

4-30 p.m. Reception, with light refreshments, by kind invitation of the University, represented by the Pro-Chancellor and the Vice-Chancellor. A statement with reference to the Exhibition of Yorkshire studies, which will be on view throughout the meetings, will be made.

8 p.m. Public Meeting addressed by J. L. Myres, M.A., D.Sc., F.S.A., Hon Sec. British Association, Wykeham Professor of Ancient History in the University of Oxford.

FRIDAY, APRIL 21st. **10 a.m.** H. J. Fleure, D.Sc., F.S.A., Hon Secretary Geographical Association, Professor of Geography and Anthropology, University College of Wales, Aberystwyth.

12 noon. J. D. I. Hughes, M.A., Professor of Law, University of Leeds, on " Diplomatic Differences Arising out of Geographical Accident."

Afternoon Excursion to Otley Chevin.

7 p.m. Bradford Technical College. A. F. Barker, Esq., M.Sc., Professor of Textile Industries, University of Leeds, on " Wool Producing Animals in Relation to their Environment."

SATURDAY, APRIL 22nd. **9-30 a.m.** from Leeds. Excursion over the Vale of York to the Wolds and York.

7 p.m. Lecture at York by W. H. Barker, B.Sc., Professor of Geography, University College, Southampton, on " Historical Geography of Western Asia."

If sufficient members send in their names for the purpose to Mr E. E. Lupton, 73, Bierley Lane, Bradford, an excursion to the Karst scenery of Malham district will be arranged on SUNDAY, APRIL 23rd.

A list of places to which to write for accommodation and a full programme may be obtained by sending stamped, addressed envelope to The Local Secretary, Geographical Association Meeting, The University, Leeds. Members intending to be present should inform the Local Secretary at least a fortnight beforehand.

Mr W. Thomas, Montrose, Whitstable Road, Canterbury, wants to order the O.S. map of East Kent (1 inch popular edition) in quantity. He will be glad to hear from any other teachers who may wish to join him in a combined order, so as to obtain a reduction in price.

Correspondence.

THE EDITOR, GEOGRAPHICAL TEACHER.

SIR.—In view of the importance, now widely recognised, of an adequate system of geographical instruction in secondary schools, we trust that you will be able to find space for the publication of the following correspondence between the British Association for the Advancement of Science and the Board of Education, which has followed upon discussion at the recent meeting of the Association in Edinburgh.

(1)

15th September, 1921.

The Secretary,
Board of Education.

SIR.—I am directed, on behalf of the Council of this Association, to invite the attention of the Board to the enclosed resolution, which has been put forward at the meeting of this Association in Edinburgh by the Sections of Geography and Education, and has been approved on behalf of the Council.

> "To draw the attention of the Council to the Revised Regulations for Secondary Schools, England, 1921, so far as they concern instruction in Geography, and to ask the Council to take the necessary steps to ascertain :—
>
> (1) Whether the effect of the new regulations is to ensure the continuity of instruction in Geography up to the age of 16 (as appears to be provided in page 7, pars. 6 and 7).
>
> (2) Whether it is the intention of the Board that the phrase 'language, literature, and history' in 48 (a) B, C, D, in the absence of specific reference to the geography of selected countries, should be construed as necessarily including adequate geographical study of the selected region.
>
> (3) Whether the Board accepts geography as a 'main subject of study' under sub-section A, Science and Mathematics."

I am, Sir,
Your obedient Servant,
O. J. R. HOWARTH.

The Groups B, C, D, referred to in para. (2) of the preceding letter, refer to main subjects of study in advanced courses, and, as defined in the Regulations, consist respectively of '(B) Classics, viz., the civilization of the ancient world as embodied in the language, literature, and history of Greece and Rome ; (C) Modern Studies, viz., the language, literature, and history of the countries of Western Europe in modern and mediæval times ; (D) The civilization of (i) of Greece or Rome and (ii) of England or another country of Western Europe in modern times, as embodied in their language, literature, and history.'

(2)

21st October, 1921.

The Secretary,
British Association for the Advancement of Science.

SIR,—With reference to your letter of the 15th ultimo, I am directed to state :—

1. The effect of Article 7 (which has remained substantially unaltered for the past 16 years) is to make it necessary that the course of work should be so arranged as to secure that every pupil who remains in the school till the age of 16 shall during his school life have passed through an adequate course of graduated instruction in each one of the subjects named in the Article.

2. In a Circular issued in 1919 it was stated that Geography "necessarily holds, as an essential part of all proper study of history, an important place in all courses belonging to Group B and Group C; and that the definition of Group C embodied in the current Regulations affords special opportunity for increased attention to Geography in connection with the work in History." This view is also applicable to the new Group D courses allowed under the recent Regulations.

3. Geography is not accepted as a main subject in Group A (Science and Mathematics).

I am, Sir,
Your obedient Servant,
E. H. Pelham.

We welcome the assurance of the Board that geography necessarily holds an important place in all courses belonging to these groups. But we feel that this recognition of the necessity of instruction in Geography is liable to be overlooked, if the Board relies solely upon the Circular of 1919 and does not repeat its provisions in subsequent Regulations; inasmuch as the Regulations of 1921 are specifically stated to supersede any of previous date. It is mainly on this account that we have solicited, and gratefully acknowledge, the Board's assent to the publication of the above correspondence. We may add that the whole position of geographical teaching to matriculation standard and in advanced courses has been brought under the consideration of a committee of the Geographical and Educational Sections of the Association, and it is hoped that this measure may assist in clarifying the position and scope of the subject, as to which there appears to be still some divergence of opinion.

We are, Sir,
Your obedient Servants,
H. H. Turner,
J. L. Myres,
General Secretaries.
O. J. R. Howarth, Assistant Secretary.

British Association,
Burlington House, London, W. 1.
November 29th, 1921.

The correspondence between the British Association and the Board of Education is valuable, not so much on account of the contents of the letters, as for their suggestion of the attitude of two important bodies towards geography. The British Association, by its appointment of a Committee of the Geography and Education Sections, has taken such steps that a thorough investigation will be made into the scope and the educational value of geography and the position which at present the subject holds in the national scheme of education.

The letter from the Board indicates that no real change has as yet been made in the official attitude of apathy and indifference, if, indeed, it may not be called hostility, to geography. The letter evades certain fundamental considerations.

The first paragraph ignores the situation created in schools by the official sanction for terminating the study of geography at the age of fourteen or fifteen, and by the Board's acceptance of this shortened course as satisfying the Regulations. (Circ. 826 [1913], p. 31).

While undoubtedly it is true that history must regard geography as an essential part of its teaching, it is also true that geography has its own subject matter and makes its own contribution to knowledge. Further, it has its own methods of study and its special function in education. It is therefore insufficient that geography should be merely the handmaid of history or a SUBSIDIARY OR ADDITIONAL in an advanced course of study. Finally, to urge that geography cannot fall within the science group is to reveal a lack of acquaintance both with the content of the subject and the trend of modern thought.

It is imperative that Circular 826 should be revised, that geography should be allowed full freedom of development in all schools and in all forms of the school. Geography has passed far beyond the experimental stage, and there is urgent need for a memorandum on the Teaching of Geography rectifying these petty and unwarranted restrictions and embodying the results of experience gained in all types of schools in all parts of the country.

W. H. BARKER.

Branches of this Association should notice that it is possible for them to arrange lectures through the Anglo-Belgian Union, 35, Albemarle Street, London, W.1. Among the speakers are Sir Cecil Hertslet, Sir Alfred Sharpe, Maitre de Leval, Mr E. Cammaerts, Mr Edwin Fagg, Mr Paul Lambotte, Prof. Lyde, Mlle van der Stichele, etc. Another source of help of this kind is the Imperial Studies Committee, Royal Colonial Institute, Northumberland Avenue, London, W.C.2. Their lecturers deal with the history and resources of British Empire, and the Institute arranges for the lectures without fee beyond travelling expenses and hospitality. In both cases letters should be sent to the above committees direct.

THIRD EDITION, 1922.

Bartholomew's Physical Wall Map of South Africa.

Scale 1 : 1,400,000, or 22 miles to 1 inch.

A new edition of this admirably clear wall map has just been printed, and shows an advance on its predecessors in the matter of the colour tints used for the greatest elevations, which now stand out much more clearly in purple. The whole colour scheme is very effective. The various shades blend harmoniously, but have been so skilfully adopted that, while jerky transitions are avoided, the tints nowhere lose their distinctness, and the various gradations from sea level up to 8,000 feet can be easily followed by contouring and colouring at intervals of 1,000 feet. Around the coast the depths of the sea are coloured at 100, 200, and 300 fathoms. The hydrography is in blue, and a distinction is made between perennial rivers and those which are dry during certain parts of the year. Special attention has been paid to the railways, which stand out prominently in red; and additional interest is lent to these by the three cross-section insets in the margins of the map. Political names are printed in black, and the town stamps, as well as the lighthouses, are shown in bright red colour. Battlefields have not been forgotten, and their sites are marked by crossed swords.

Such a wall map, showing so prominently the wonderful uplift of the land, is just what is wanted in every school where the geography of South Africa has to be efficiently taught, and its clarity and effectiveness for that purpose should meet the wants of the most fastidious teacher.

As a physical picture of the great sub-continent it should also prove useful and interesting on the walls of public libraries and other institutions.

Printed in two large Sheets—Size when joined about 4 *feet by* 6 *feet.*
Price—In Sheets, Unmounted - - - - - - 10*s.* 6*d. net.*
, *Dissected, Mounted on Cloth, and folded to size* 11 x 9 *inches, and with eyelets for hanging on wall* - - - £1 1*s. net.*
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Published by JOHN BARTHOLOMEW & SON, LTD.,
CARTOGRAPHERS TO THE KING,
The Geographical Institute, DUNCAN STREET, EDINBURGH.

Everyday Life in the Old Stone Age. By M. and C. H. B. Quennell. 109 pp., 5in. x 7½in. Paper boards. Batsford. 5/-.

This is the first of a projected series of six books, of which two will deal with prehistoric ages, while the others will describe Romano-British and Saxon, Norman, Mediæval, and Renaissance ages respectively. It is the work of the authors of the well-received "History of Everyday Things in England," and, as in the earlier work, the colour and line drawings are also the work of the writers. Careful compilation of the text is indicated in many directions, and the majority of the 70 illustrations are interesting, though opinions will differ as to the accuracy of several of the reconstructions, while the general boldness of their execution may possibly give a false impression, to immature students, as to the experts' present knowledge of the subject. Binding and paper are not above criticism for a small book at this price, particularly just at present when so many excellently produced complete books and part volumes are being issued on this topic. Perhaps the greatest doubt arises as to the age of the reader for whom the book was written; from the introduction we gather that it was intended for "boys and girls" and the "orange and knitting needle" wheeze of our childhood, with the innovation that we "can eat the earth afterwards" (p. 4) may appeal to the very young, who will also be interested to hear that "there is no necessity to rush off and buy skates in preparation for the next Ice Age" (p. 5). There are many similar remarks elsewhere, but as a contrast we are also told that "skeletons [of Grimaldi man] show marked differences to Crô-Magnon man. The skulls are dolichocephalic, but the mouth projected in a prognathous manner" (p. 69)—hardly a suitable expression for the average young pupil.
W.E.W.

Philip's Comparative Wall Atlas—United States. Mounted on cloth; dissected; eyeletted; in case with Handbook. 47/6. Or 8 maps on one roller at 42/6.

So far, nine sets have been published in this series, viz., separate Wall Atlases for the several continents, one for World Relations, and a large scale set for the British Isles. The present U.S.A. issue is to be followed by India, and possibly by South Africa. These wall atlases are so well known to teachers and are in such general use that it is only necessary to call attention to the special features of the new productions. The Editors (J. F. Unstead, E. G. R. Taylor, and G. Philip) have again to be congratulated on a careful collection of material and on a well devised system of displaying it. The geography of United States of North America is demanding increased attention from both teachers and pupils, and the increased scale available for these new maps is an advantage. Each of the eight maps is, as before, 43 by 33 inches, but while the earlier North America wall atlas had to be drawn on a scale of 1 in 9 millions, the present issue is on a 1 in 4½ millions scale for seven of the maps, and the eighth (Commercial development of North East U.S.A.) is as large as 1 in 2¼ millions, thus giving space for a large amount of detailed material most attractively set out by novel economic symbols and colouring and possessing an unusual value for both short and long range use. The seven smaller maps cover the different aspects of geographical study on the same lines as the earlier wall atlases and have similar conventions; the colours are well chosen, and the printing registration is good. They are well mounted, conveniently folded, and at, approximately, 7s. 6d. each must be considered cheap. All the maps are good, but the Natural Vegetation Map (No. 6) also calls for special praise.
W.E.W.

Geological Map of the World. H. B. Milner. 60 x 105 cm. E. Stanford. London. 1921. Sheet, 25/-. Mounted in Case, 37/6. On Rollers and Varnished, 40/-.

With the development of geographical education the structural basis of physical features is receiving increased attention from students and teachers, and the reviewer is glad to note that the use of M. de Lapparent's "Geographie Physique," with its excellent discussions of the orographical bearings of structural facts, is spreading in England. De Lapparent and Suess both may need much revision, but they nevertheless help us to understand the foundations of the studies we try to develop. As an accompaniment to these books and for class demonstration, we have long needed a geological map of the world, and it is provided here with a considerable measure of success. Large areas are shown as still unexplored, so large that one wonders whether all the available work on Siberia and China, for example, has been utilised, but it is probably best to avoid conjectural colourings. The vast amount of Archæan rock exposed on the earth's surface is strikingly emphasised by this map, which helps very clearly to demonstrate the relation of the great fold systems to these old and resistant masses. The teacher may not introduce a great deal of structural description into his class-work, but he will do that work with trebled efficiency if he has mastered the structural facts for himself. The map is on Mercator's Projection. A short explanatory pamphlet is issued with the map.

Historical Geography of Wealden Iron Industry. M. C. Delany. 64 pp. and 3 maps. 21 x 14 cm. Benn Bros. 4/6. 1921.

Though this monograph was issued under a scheme connected with the Geographical Association, it may not be inappropriate to commend Miss Delany's diligent work in collecting a good statement of facts about this famous extinct industry. Her citations are numerous and seem to be careful, and her presentation of the matter is attractive. A couple of chance references to prehistoric matters are unfortunately wrong, but this in no way affects the main subject. Miss Delany's information about the diminution of forests and the development of communications from the middle of the sixteenth century onwards will be found interesting in connection with other researches besides those on the iron industry. There is too widespread a tendency to think that very little development of communications occurred before the 18th century. The work of the previous century or so may have been poor enough, but it seems to have been a factor in the evolution of the Western European nation-state from the smaller regions or pays which were the effective biological units of the middle ages in many parts.

Agricultural Atlas of Wales. J. Pryse Howell. Pub. Ordnance Survey. 1921. 37.5 x 27 cm. 5/- net.

This is a new and valuable experiment which deserves special support, not only because of the excellence of the work done, but also because the preface tells us that if the interest in this Atlas should prove sufficient, it is intended to proceed with the issue of a similar atlas for the whole of England and Wales. This should suffice to spread the sale of this trial volume.

It includes 22 maps on tough but transparent paper, giving by means of dots the distribution of specified agricultural features or products in Wales. The system of the dots is given, with a table of statistics for each map, and the work is based on the parish returns supplied to the Board of Agriculture for 1918. There is a stout pocket in the cover, containing orographical, geological and rainfall maps of Wales; they are loose and on stout paper, so that one may place any one of them under one of the transparent maps and follow the correlations. The geological map is the official one, now largely out of date owing to the work of Profs. Jones, Pugh, Cox, Greenly, and others, but the other work has not yet been put on a map of Wales.

The details were put in on a quarter-inch map and the result reduced down to the 1 : 1,000,000 scale. A preface gives some interesting points as regards correlations of distributions. Mr Pryse Howell has been working for a number of years at agricultural data, first at Aberystwyth and then at Oxford, and has thoroughly deserved the success which has now come to him. His work should be of great value and of interest to teachers of geography.

Human Geographies (Secondary Schools Series). J. Fairgrieve and E. Young. Book I. British Isles. 19 x 12.5 cm. 252 pp. G. Philip and Son, London. 1921. 2/9.

This book by experienced and successful teachers of geography is sure of a general welcome. In the series the authors hope to make a place for studies of physical, economic and political geography within a regional scheme, the next volume being one on " The Atlantic Hemisphere," a striking tribute to the fact of the new gathering of political power around the Atlantic shores for a time. England and Scotland get more balanced treatment than one usually finds in school-books, but the section on Ireland might be expanded with great advantage. The book starts from the economic activities of the people, and the points are illustrated by interesting maps demonstrating particularly the location of towns. The sequence of argument is usually from crops or other products to climatic and other factors affecting production, and thence to the organisation of economic life through routes and towns. Historical considerations are kept subordinate but not neglected, and the map of parish churches and parish boundaries in the vale of Pickering will be found specially interesting. There are numerous little points one might raise in discussion with the authors, but there is no doubt that they have thought carefully of the possibilities of the pupils' minds, and have made a just compromise between the tendency to interest them at all costs and the tendency to give a highly systematic argument. We hope the series will prosper greatly.

Nations of the Modern World. Sir Halford Mackinder. 5th Edition. 19 x 13.5 cm. 328 pp. G. Philip and Son, London. 1921. 3/6.

This is a re-issue, with some revision, of a well-known book, but it does not take up the question of the world after the war, as this would entail extensive reconstruction of the scheme. The author proposes to issue another book for this purpose. The present work is so well known as hardly to need comment. It deals chiefly with the geographic settings of political problems of military and diplomatic ambitions, rather than with factors and facts of social and economic life of the peoples. The author's well known position as an exponent of the Imperial British Idea naturally colours the book here and there.

Rainfall of Chile. M. JEFFERSON. Oxford University Press, American Branch. 1921. 19 x 13 cm, 32 pp. and 10 maps and figs.

This careful monograph issued for the American Geographical Society gives careful data and some fine coloured maps of rainfall distribution which will be found invaluable for any study of the evolution of settlement in Chile. The map corrects the rather rough generalizations previously available. It shows us clearly the zone of low rainfall (less than 50 cm) along the Midland Valley south of Santiago, and the heavy rainfall (over 200cm) of the country just south of the famous Frontera (more or less between Concepcion and Valdivia); the Frontera itself has heavy rain on its heights, but the district forms a " march " over against the wild wet forest farther south. The Andean slopes facing the Chilean Archipelago are shown to have a rainfall of over 500 cm. Settlement in central and southern Chile has followed the interior valleys partly because of their dryness (Darwin noted the absence of trees on the low level lands—" Beagle," p. 299), and partly because of their soils. The lack of summer rain in the Midland Valley farther north has not only helped to promote settlement, but has made irrigation necessary.

Recent Colonization in Chile. M. JEFFERSON. Oxford University Press, American Branch. 1921. 19 x 13 cm, 52 pp. and 15 maps and figs.

This is a companion monograph to the above, and both should be studied together. The Chilean people are claimed to be the descendants, in the first instance, of Spanish soldiers and native women, including princesses. Even the British and Irish families have acquired native blood by inter-marriages with the Spanish-speaking people. The labouring class, the rotos, has much more Indian blood, and the social system is roughly described in this monograph as feudal, though this term is not intended to mean more than that the general condition of the labourer is somewhat as it was in Europe in the later middle ages. The monograph gives very valuable facts about immigration into Chile in the nineteenth century, and shows that the supposed Germanization of Southern Chile is a myth. There may be 20,000 German-speaking people in all Chile and 10,000 English speakers. A large number of these people is in business in the great cities, though some of the Germans came out to take up land and received land in the south (Valdivia) from which the natives had been evicted by the aristocracy for profiteering reasons. The Frontera receives special consideration, and the author finds the island of Mocha off the middle part of the Frontera the great dividing point in Chilean climate. The difficulties of clearing and communication in the wet south are brought out strikingly and correlated with the savage invincibility of the Araucanian Indians. Omitting regions practically uninhabitable at present, Chile may be said to have 160 people to the square mile, only 8 per cent. of her area being productive. There is thus practically no room for immigration unless new discoveries alter circumstances.

The Provinces of Ireland. Edited by GEORGE FLETCHER. 6/6 each. 17.5 x 13 cm. Camb. Univ. Press. 1921.

ULSTER. 186 pp. Folding physical map, coloured geological map, many illustrations.

MUNSTER. 176 pp. Similar maps and illustrations.

These books follow the not over successful scheme of the Cambridge County Geographers, but avoid its weakness to a large extent by having articles contributed to each book by distinguished workers on the various subjects, while the work is edited by Mr Fletcher, whose knowledge of Ireland is widely acknowledged. One welcomes a book with articles by Stewart Macalister, Lloyd Praeger, Isaac Swain, E. C. R. Armstrong, and R. I. Best, a strong band for an editor to gather around him. To Irish teachers these books must bring a mass of local information previously out of their reach, while the British teacher will now be provided with something that can supplement the rather inadequate treatment of the different parts of Ireland current in English books. We look forward to a broad geographical and historical treatment of Ireland in a future book that will use these valuable compendia as its basis and will avoid wearisome length by reference to their multifarious facts. It is difficult to select special points, but the diagram of Cork Harbour and the geological factors of its form, given on p. 34 (Munster) will be found very suggestive by teachers.

Mr Fletcher's interest in the development of Irish industries and administration is brought out strongly in the sections which he contributes.

The New World. ISAIAH BOWMAN. 25 x 18 cm. vi. + 632 pp., 215 maps, 65 engravings. World Book Company, New York. 1921. English publishers, Messrs Harrap. Price, 21/-.

This discussion of post-war problems the world over is enriched by a large collection of maps and illustrations, some of which have appeared from time to time in the " Geographic Review." About two-thirds of the book is given to Europe, the world's present storm centre. South-west Asia is treated in some detail, and othe chapters discuss Inner Asia, the Far East, the Pacific Realm and Australia, African domains of the European Powers, and Latin America. A fairly considerable bibliography is followed by an appendix giving a list of the chief treaties 1814-1920.

A book of this kind is of special interest to British teachers and students, because it helps us to see ourselves as others see us. It recognises the fact that the pre-1914 world was a going concern, and asks repeatedly whether the new system can be set going in an orderly manner; whether the new democracies can survive; whether the chief victors in the 1914-18 war can meet their new responsibilities; whether we are moving towards peace or war with our additional 2,000 miles of state-frontiers in Europe and the conflicting claims now at least as clamorous as before 1914, with Austria, Germany, Hungary, and Bulgaria looking over their borders at unredeemed lands just as Italy and Serbia of old. One notes that the maps mark the German territories of the left bank of the Rhine as "under special régime."

The chapter on the British Empire gives a valuable list of the chief raw materials found or produced within that organisation and maps which illustrate British trade, and foresees the need for much wisdom and moderation if the great efforts Britain must make to develop foreign trade, in order to pay her debts, are not to lead to fresh wars. The quotation of a newspaper headline, "The Gospel of Empire; Is there Oil in Mesopotamia?" is fairly telling. The treatment of the Irish, Egyptian and Indian problems is moderate, while there is a short statement on Australia with its increasingly urban population in a land that has not yet two people per square mile average and is at the gates of the over-crowded lands of ancient civilization of the Far East.

The creation of an Austria Irredenta in the Tyrol is plainly deprecated, and the German indemnity is discussed without partiality. In the matter of Luxemburg no mention is made of France's objection to the entry of the little Duchy into her customs union, though this would have illustrated the conflict between economic and political aims that holds France down at the present time. The chapter on Belgium shows unfortunate hesitation in face of a first class European problem. The detailed treatment of Hungary seems fair, while students will welcome the maps and discussions of Albania.

The weak points of the book are that it suffers from the difficulty of rising above the registration of miscellaneous information and that it hardly looks beyond our present anarchic system of rival sovereign-states, but its facts will be found of great use by the teacher, and its point of view is interesting and nearly always fair.

The Association is glad to have the opportunity of congratulating the University of Sheffield and Dr. R. N. Rudmose Brown on that University's decision to institute an Honours School of Geography. The school is to be in the Faculty of Science, and this betokens a welcome intention of developing the strict discipline of the subject in which Dr. Rudmose Brown's interest is well known. The course will cover three years of post-intermediate work devoted to geographical study, with sudsidiary courses in the first year in History and Economics and in the second year in Geology, Botany or Zoology. The course is so arranged that a balance is held throughout the three years between the physical and the human sides of geography. The financial stringency which Sheffield, in common with other universities, is now experiencing may cause the temporary postponement of the full operation of the school.

Volume I. of the Transactions of the Newcomen Society, founded in 1919 for the Study of the History of Engineering and Technology, will be available soon, and will contain, among other valuable papers, one by Rhys Jenkins on the "Rise and Fall of the Sussex Iron Industry." Those of our readers who have obtained copies of Miss Delany's excellent booklet on the Historical Geography of the Wealden Iron Industry, will be interested in Mr Jenkins' point of view. Summary sections of his paper have already appeared in the weekly "Engineer" for January 27th and May 11th, 1921.

THE GEOGRAPHICAL TEACHER.

SUMMER, 1922.

Editorial.

THE Central Office has sent the best thanks of the Association to the Finchley Teachers' Association, which kindly contributed half a guinea to our funds ; to the Bishop Auckland Branch, which generously returned its subvention, and to the Bristol Branch, which decided to retain the subvention only on subscriptions actually collected by the branch officers. A number of branches have also greatly helped by forwarding lists of members from time to time, and so helping the office to know who have paid. With the present large size of the Association this help is particularly welcome, and greatly assists smooth working. There is great need for an effort by branch officers to maintain their branch membership, as a fluctuating and uncertain total is a hindrance to every part of our work.

THE thanks of the Association have been sent to the University of Leeds and the numerous other authorities who combined to make the Yorkshire visit of the Council both enjoyable and successful. An account of these meetings appears elsewhere, but reference must be made to the matter here also, as a mark of our deep appreciation both of the generous hospitality shown to us and of the serious interest taken in the subject by the University of Leeds and other Yorkshire authorities. To Leeds, Bradford and York, many thanks.

AT the Council meeting of the Association held at the University, Leeds, the resignation of Rev. Dr. James Gow from the trusteeship of the Association was received with regret, and Principal J. H. Davies, of the University College of Wales, Aberystwyth, was appointed in his place.

The chairmanship of the Exhibitions Committee of the Association has been vacant since the retirement of Mr L. Brooks from that position. The Council elected Mr V. C. Spary, of the William Ellis School, to fill the vacancy.

MISS H. DUNCAN asks for data as to the number of hours devoted to geography per week in the upper divisions of girls' secondary schools, and the Central Office of the Association will be glad to collect details and send them to her if members will forward any information on the subject.

WE regret that by an unauthorised change the last number of the GEOGRAPHICAL TEACHER appeared numbered Vol. XII., No. 4. It should have been Vol. XI., No. 4. Will members please make the necessary correction in their filed copies?

TEACHERS of geography will be interested to see in the Sociological Review for April, 1922 (5s. per copy from the Society at Leplay House, 65, Belgrave Road, S.W.1.), an article by Mr C. B. Fawcett under title "British Conurbations in 1921." Each of the "continuous groups of habitations" is studied and statistics are given, while two maps greatly add to the value of the article; six of the groups are shown to have more than one million people each, fourteen more than a quarter of a million, thirty-nine more than a hundred thousand, and all these at least need a reconsideration of local government problems. The Review also contains a valuable article on the Steel Industry of South Yorkshire by Prof. C. H. Desch, as well as notices of the life and work of the late Viscount Bryce.

THE Geographical Journal for April, 1922, contains an article by Mr O. G. S. Crawford, which is of special importance for its suggestions of valuable work that can be done by teachers in their own localities all over the country. We can but hope that several branches of the Association may take up the task of helping Mr Crawford to improve the Ordnance Survey Maps from the view of antiquities and place-names. They are already a source of pride; they could be made far richer still, and in return for assistance there is no doubt that the Ordnance Survey could co-operate in several ways in local study and mapping connected therewith.

CONGRATULATIONS to the Touring Committee on the remarkable success attending their work. As all the organised tours are already fully booked up, the Chairman is arranging for some additional tours. Full details will be found in another part of the magazine, and members who wish to be included are urged to book promptly.

ATTENTION is called to the revised prices of large scale Ordnance Survey Maps and to the new concession affecting small bulk orders of small scale maps allowed by the Ordnance Survey Office. For details please see the article "Ordnance Survey Map Issues V.," page 307.

WE are informed that there will be geographical vacation courses at two places in France this summer. Both Grenoble and Bagnères are admirable centres for excursions. Details may be obtained by writing to the following:—For Grenoble, M. R. Blanchard, Professeur à la Faculté des Lettres, Grenoble; for Bagnères-de-Bigorre, Pyrenees, M. Dognon, Professeur à la Faculté des Lettres, Toulouse.

THE next number of the Magazine will be distributed in November and will contain the notices of the Annual Meetings, 1923.

Systematic Anthropology of Asia. V. GIUFFRIDA-RUGGERI, Anthropological Papers, Univ., Calcutta. R. Cambray and Co., 9, Hastings Street, Calcutta. 1921. 110 pp, 24 x 15½ cm.

This is a most valuable outline summary of observed facts about the physical characteristics and measurements of the various peoples of Asia, translated into English by Mr Chaleladar and issued shortly before Prof. Giuffrida Ruggeri's lamented death. The author believes in three genetic centres in Asia, one for the Eurasiatic North, one for Eastern Asia (whence the formation of the yellow stock and its derivatives in America and Oceania), and one for the southern regions of the Old World. If we place the two first centres towards Zungaria they may be contiguous. The author thinks of earlier spreads of Ainus, Negritoes, Australoids (Veddah, etc.), Dravidians, and of a later spread of Leucoderms, Mongolians, Indonesians. There are very numerous tables of figures and references to bibliography that will prove invaluable to the serious student who naturally finds accounts in most books very unsatisfactory.

The Geographical Association.

TOURING COMMITTEE.

SUMMER TOURS, 1922.

Special Notices.

I. As the Tour to the English and Scottish Lake Districts for August 12th—20th is fully booked up, the Committee has arranged to organise a Supplementary Tour to the same districts as follows :—

August 21st—28th. Starting from Bradford.

1st Day—Bradford, Aire Gap, Ribblesdale, Lonsdale, Grange-over-Sands, Windermere, Ambleside.
2nd Day—Rydal, Grasmere, Thirlmere, Derwentwater, Keswick, Carlisle.
3rd Day—Gretna Green, Annandale, Clydesdale, Glasgow.
4th Day—Loch Lomond, S. Highlands, Glen Ogle, Loch Earn, Callander.
5th Day—The Trossachs, L. Katrine, Stirling, Bannockburn, Edinburgh.
6th Day—Edinburgh till noon, thence to Melrose or Kelso.
7th Day—The Border, Alnwick, Newcastle, Durham.
8th Day—Teesdale, N. Yorkshire, and the Yorkshire Dales.

Fare, including motor, 1st class hotels, lunches, and all other meals, gratuities, etc. :—

Members	£13 13 0
Non-Members	£14 14 0

II. Special Tour to Switzerland.

If necessary, a Second Party will be conducted on the Regional Tour through Switzerland, leaving London about August 5th. The tour is of 22 days' duration, and includes Lucerne (3 days), Goeschenen, Andermatt, Furka and Grimsel Passes (diligence), Meiringen, Interlaken (2 days), Grindelwald, Lauterbrunnen, Zermatt (2 days), Chamounix (2 days), Geneva (2 days).

Inclusive Cost of Tour :—

Members of the Geographical Association	£28 10 0
Non-members ,, ,, ...	£30 10 0

Further particulars may be had from Miss L. Lee, F.R.G.S., 69, Walpole Road, Boscombe, Bournemouth.

All bookings to be sent to Mr E. E. Lupton, F.R.G.S., 73, Bierley Lane, Bradford. (Enclose stamped envelope for reply).

The 9th Congress of the International Railway Association held at Rome, April 18th—May 3rd, 1922, was made the occasion for the issue of a Special Italian Railway Number of the " Railway Gazette " under date April 18th, 1922. The 88 large pages devoted to Italian railways contain material frequently required by teachers and not usually available to the general public. The text is in parallel columns, English and Italian, and contains *inter alia* such items as : General history of Italian railways ; statistical summaries ; the three great direct lines ; electrification of railways ; port of Genoa ; ferry boat services ; connections with the continent ; mountain railways, etc. The reasoned analysis of the effects of State control is a particularly well written feature. The splendidly reproduced photographs occupy 38 pages, and each would prove attractive to the average pupil. The maps and other illustrative diagrams also deserve special notice, and teachers particularly will appreciate the " lengths and profiles " diagrams. On page 22 an extract from the Milan-Bologna-Florence-Rome working time-book of passenger trains answers the ever-present conundrum as to how new time-tables are drawn up by the railway companies—easily distinguished lines in the drawing replace the coloured threads of the time-table board, and the 24 hour clock is used. The price of the special number is 2/6.

Diplomatic Difficulties arising out of Geographical Accident.

J. D. I. **Hughes**,
Professor of Law, University of Leeds.

MANY topics might be taken up under this title, but for the moment let us confine ourselves to problems presented by international waterway communications. These problems are of particular interest since in this connection geographical considerations have formed the basis of an appeal to a higher law of nature which ought to over-ride the particular claims of separate sovereign states. We cannot here enter into the philosophical history and implications of this appeal, but it may be noted that on the whole it has been a successful appeal. Gradually the great means of water communication have been opened up to international intercourse. We may take the case of rivers first. The navigation of the St. Lawrence was a source of dispute between Great Britain and the United States of America for some fifty years. The geographical conditions are simple—that the lower part of the river lies wholly within British territory, together with the outlet to the sea, whereas the south shore of the river from Lake Ontario to a certain point on latitude 45° N. belongs to the United States. In 1826 the United States claimed that there was a natural right for the inhabitants of the upper branch of a navigable river to have free communication with the sea, even though the lower part and the mouth are within the exclusive control of another State. This was the same argument as had been used against Spain in reference to the Mississippi. The British reply was a firm adherence to the rights consequent upon State sovereignty—every State must have full control over its own waters. Finally the matter was settled by the Treaty of Washington in 1871, whereby free navigation was granted in perpetuity of the St. Lawrence to United States subjects, and in return a similar right was granted to British subjects for the navigation of the St. Clair Flats Canal and the rivers Yukon, Porcupine, and Stikine, giving access to Canadians through the territory of Alaska to the Pacific.

The case is one where obviously the geographical lie of the river raised the fundamental question of our present century, the question of the modification of the rights flowing from the individual sovereignty of the separate State. In 1826 the U.S. claim was scarcely valid according to the diplomatic usage of that time. The doctrine of free navigation was one of the liberal doctrines arising out of the turmoil of the French Revolution, and had only commenced to exercise its influence in 1826. A short survey of the position with regard to the rivers of the world throughout the 19th century indicates that the geographical argument has continually gained in weight up to and including the Treaties of Peace after the recent war. The Congress of Vienna, 1815, arrived at a general agreement for free navigation of international rivers, subject to police and other necessary control. Regulations were provided for the navigation of the Rhine and other rivers. Let us follow the subsequent history of the Rhine, as illustrative of the general movement. Holland raised the first difficulty by claiming tolls from vessels navigating the lower channels. So far as riparian States are concerned this difficulty was removed by the Convention of Mayence, 1831, but non-riparian States were still penalised. The Congress of Paris in 1856 expressed the view that it was part of European Public Law that all commerce had freedom of navigation on international rivers. Then followed the Convention of Mannheim, 1868, conceding this right, but subsequent regulations whittled it down again so far as non-riparian commerce was concerned. The effort has again been made to gain freedom of navigation in the Peace Treaty, e.g., with Germany, 1919. A declaration is made towards this end for " vessels of all nations and their cargoes," and pending a general convention on the matter, the Convention of Mannheim is to remain in force for the regulation of the Rhine.

The Danube again has its own history, but it may be noted that by the recent Peace Treaty the following are declared international rivers whereon the flags of all Powers are accorded equality of treatment:—The Danube from Ulm, the Elbe and Moldau up to Prague, the Oder from its confluence with the Oppa, the Niemen from Grodno, and the Rhine—Danube waterway when constructed. Non-European rivers have also been opened up, since dates ranging from 1853 onwards, and subject to conditions in certain cases, examples being the Amazon, the waters of Uruguay, the Congo, the Yang-tze-Kiang.

Another type of water communication is, of course, the open sea, and diplomatic troubles have been more complicated here because not only is the sea a highway for nations, but also it affords the possibility of valuable fisheries and other trading interests. Roman lawyers regarded the sea as common to all. Ulpian in regard to it uses the phrase " quod natura omnibus patet." Note the word " natura "—the same as used by the United States in their claim to a " natural outlet " to the sea. Towards the close of the Middle Ages cases do arise, however, of effective claims being made to appropriate parts of the sea and exercise sovereignty thereon. Venice, for instance, claimed the Adriatic. The vast claims of Portugal and Spain based on the papal bulls of Alexander VI. are sufficiently well known. Great Britain claimed the Narrow Seas, the North Sea, the Atlantic from North Cape to Cape Finisterre. Such claims carried obligations, however, e.g., to clear the sea appropriated from piracy. The practical results from such claims may be seen from the fact that in the 17th century Great Britain compelled foreigners to take out an English license to fish in the North Sea. Even so late as 1805 the British Admiralty Regulations laid down that foreign ships who should meet one of H.M. ships down to Cape Finisterre should strike their topsail and take in their flag " in acknowledgment of His Majesty's sovereignty in those seas."

The story of the winning of the Freedom of the Seas to be part of international doctrine will form the subject of a further article.

A Regional Geography. Europe. MACMUNN AND COSTER. 343 pp, 18.5 x 12.5 cm ; many maps and end-piece maps. 4/6. Oxford Univ. Press. 1922.

A book which was planned by Prof. Herbertson is sure of a welcome from members of the Association. It has been worked out by Misses Macmunn and Coster on his well-known lines, insisting on the physical basis and the natural region, but allowing for the political unit in subordinate fashion. A good many of the maps are fairly fresh and some of the detail is new, while there are interesting paragraphs about the lives of the people. We think it would have been better to add a short statement about political units in each of the regions. The inclusion of the whole perimeter of the Mediterranean is a valuable feature. France is made the culminating point and gets fifty pages and many sketch maps, among which Fig. 64, showing the windings of the Lot, might be made more instructive if teachers urged their students to put in selected contours in red. Though the reference to the Rhone—Saone basin are good, the opportunity is missed of conducting the pupils down that great line through all the changes of vegetation and opportunity from Dijon to La Camargue; we must make more effort to give vitality to our geography if we are to conquer for it the place it should occupy in the world that is claiming everyone's citizenship. The red printing on the end pieces is valuable; readers of this magazine will recognise the map of the Russian plain based on that by Miss Gillette in this magazine. Some copies have not this end piece, and intending purchasers should see that it is in their copy.

An Experiment in Geographical Education.

A GENEROUS endowment placed at the disposal of the University College of Wales, Aberystwyth, for the assistance of educational travel by past and present members of that College made possible an experiment that may be of some general interest. The students found half the cost. The business side of the tour was entrusted to " Voyages Branger " of 5 rue Cambon, Paris, to whom acknowledgment is due for their care and efficiency in the matter.

The object of a fortnight's tour was to demonstrate some main facts both of the physical geography and of the distribution of facts of civilization in France. For this purpose the four greatest river basins were visited, so as to show the first-class features in each case ; the scarps which are all important in the Seine basin, the successive regions of the Saône-Rhone from Dijon down to the Mediterranean with its contrasted east and west edges, the Garonne coming into the structural trough between Plateau Central and Pyrenees and receiving tributaries from the western gorges of the plateau, the Loire with its feeders from the northern side of the plateau and its westward bend beyond La Sologne. Perhaps on the physical side the most memorable experience was the clear view of the great peaks of the Pyrenees from the ramparts of Carcassonne and the contrasts seen on looking northward from the same ramparts to the horizontal sky-line of the Montagne Noire, albeit on this occasion whitened by a long streak of snow. The vegetation, natural and cultivated, came in for special attention, and the travellers watched keenly for the first of the jardins maraîchers on the way towards Paris, for the first mulberry along the Rhone, and most of all for the first appearance of the olive on the southward journey. In this connection it was noted that the olive became important about the village of Pierrelatte, while on the westward journey from Narbonne it lost its importance well before Carcassonne was reached. The transition from the steeper-roofed houses of Frankish France to the more gently sloped roofs of the more Roman south, the scattered homesteads and infinity of tracks on areas of impervious soil, the agglomerated settlements on calcareous plateaux like Beauce, the villages and cities set upon a hill in the calcareous areas of the south, the cultivation in the intermont basins among these same limestone hills, and many other features were studied as closely as time permitted, the travellers using sometimes the train and sometimes the motor charabanc.

Naturally, special attention was given to the cities, and Rouen was taken for special study as compared with Winchester. Paris was glanced at, but left in the main for study by individuals. Chartres was considered as a typical cathedral market-city of the Paris basin, while Orleans was looked at more from the strategic point of view. The uniqueness of Avignon gave it special claims on attention, and Roman Arles and the dignified Nîmes were investigated with some care. Carcassonne, as always, rivetted everyone's attention, and Toulouse, the capital of the south, was shown as an effective contrast to Paris.

The contrasts and boundaries between Normandy, the Ile de France, Beauce, Brie, Bourgogne, Provence, Languedoc, Aquitaine, Limousin, Berry, Sologne and so on were all brought out in turn, but it was necessary unfortunately to leave the west coast and Brittany for another time. The main purpose was taken to be the demonstration of the contrasts and connections between the more Roman and the less Roman, the south and the north, in France, and thus to promote an understanding of the special function of France in European life. The expenses, special and general, including those met by individuals and those met by the endowment, were about £27 per head from London back to London.

Yorkshire Meeting of the Geographical Association.

THE annual Spring meetings of the Association were held this year in Yorkshire by invitation of the University of Leeds and the Leeds, Bradford, and York branches. With the exception of one at Bradford and another at York, the meetings were held in the Great Hall of the University of Leeds.

An exhibition of Yorkshire studies on view throughout the conference was instructive not only because of the actual material, but because of the indications of the lines along which local studies might proceed. One collection of maps, charts, models and rock specimens dealt with structure and glaciation, others with Yorkshire water supply and present and past road and water communications. A further series showing map analysis indicated the lines of regional surveys.

A distinctive feature of the conference was the kindly interest shown by the Pro-Chancellor, Vice-Chancellor and Professors of the University and by the Lord Mayors of both Bradford and York.

The Pro-Chancellor took the chair at the first public lecture on "The Distribution of the Greek City States," given by Professor J. L. Myres. The eastern Mediterranean is a world in itself, the full life of whose past forms an unending story slowly told by patient researches into many branches of knowledge. Prof. Myres presented the activities of that past as so many 'facets,' as Sir Michael Sadler aptly described them.

The following morning, Professor Fleure opened the day's proceedings with a lecture on "Race and Environment." During the lecture he traced the development of certain racial characters, showing how deeply environmental conditions and the 'value' of these to early man have impressed themselves in length of bone, cephalic index, facial features, pigmentation, hair, etc. Such development necessarily involves GRADATION of race characters and the divisions of white, black and yellow races are arbitrary, doing violence to the unity of the human family with its illimitable variations due to different or changing geographical conditions and values.

The lecture by Professor Hughes on "Diplomatic Difficulties arising out of Geographical Accident" was in sharp contrast in the nature of its data with the influence of environment on race. International law is essentially of human origin, and its arbitrary character may over-ride 'natural law' in such matters as the freedom of the seas or international rivers. Nevertheless, as Prof. Hughes showed, the tendency is almost invariably for 'natural law' to triumph over arbitrary international law where diplomatic difficulties arise out of geographical accident.

In the absence of Mr J. Pryse Howell, who was billed to give an account of the new Agricultural Atlas of Wales, the interval between the above two lectures was taken by Mr Fawcett in a discussion of some of the features of that atlas. During the afternoon Mr Fawcett conducted a motor party to Bradford via Otley Chevin. Though haze shut out the middle and distant view, the scene from the Chevin overlooking Otley provided a map of nature, and this was ably used to its full limits in describing the site and development of Otley as the market town of Wharfedale.

The reception at Bradford by the Lord Mayor was followed by a lecture on "Wool-producing Animals and their Environment" given by Professor A. F. Barker. Geographers found much of value in the lucid description of the development of wool and hair-bearing animals from their common ancestor, and of the stock-raising problems involved in the utilisation of differing geographical conditions for the production of specific fibres demanded by the trade.

The motor tour arranged for Saturday and conducted by Mr Fawcett was badly marred by cloud, cold and wet. The run across the Vale of York from Leeds to Selby and thence through the Wold country approaching York from the east gives perhaps the maximum variety of structure, land form and panorama for any similar distance in England.

A reception at York by the Lord Mayor was followed by a very clear and interesting address on "The Historical Geography of Western Asia" by Professor W. H. Barker, which terminated one of the most outstanding conferences in the history of the Geographical Association. The indefatigable efforts of the officers of the Yorkshire branches and the Yorkshire welcome were specially appreciated.

Commercial and Library Chart of the World. Canvas, rollers, varnished. 45/-. 54in. x 70in. W. and A. K. JOHNSTON.

The name of the producers is sufficient guarantee that the problem has been seriously tackled. The map is boldly drawn, and its colours, particularly when toned down by varnish, whilst contrasting sharply with one another, are not too elemental. Ocean currents, some ocean depths, ice limits, steamship routes, submarine telegraphs, coal and oil bunkering stations, are all clearly indicated, and are easy to read at a respectable distance, but the map is also intended to be used for detailed reference, and it is in the smaller details that the map occasionally calls for revision. The map is politically coloured, and the majority of the recent territorial changes are shown, but even accepting the fact that many of the changes are merely temporary expedients, something would have been gained by showing all of them. This would have meant some further sub-division of Russia, for example, and all reference maps issued during periods of oscillating boundaries should be dated. Two different forms of black line are used for political boundaries, but as one of these is also used for inland telegraphs and the other is used for dry river beds, a certain amount of confusion arises. There is also a little doubt as to whether certain lines represent caravan routes or not. The equatorial scale is about 1 in 23 millions, and the main map is on Mercator's projection, extending slightly north of 79 N. lat., with a north Greenland extension to beyond 83 N. on "half the scale"—whatever than may mean, for no compound scale is included. It is recognised that a commercial map is the most difficult of all maps to produce, and much more experiment is necessary before the special cartographical problems can be considered to be satisfactorily solved, but granting all that, surely the great wireless stations, for example, are important items on a commercial chart. River navigation of the great world arteries should be shown, with some larger scale inset maps of such navigation which might conveniently replace some of the hackneyed Suez Canal and Panama Canal insets employed on this map. Relief on the main map is indifferently shown by open hachuring, but why does a large scale inset that purports to show the transcontinental routes of N. America omit all indications of relief? The international date line must be considered as only approximately shown at present and should have been dated. The place-names are inconsistent, sometimes the old name is used, sometimes the new, and sometimes both. In naming sheets of Chinese water the term "Nor" is used in some cases and the term "Lake" in others. It would be helpful to show change of gauge of railways, and so prevent the misconception that usually exists as to "through" routes. The choice of railways shown is not always happy; Liverpool is shown without a railway, and Carmarthen is shown in N. Pembrokeshire and Cardiff is omitted, while the chart shows Appleby. The Thames and Severn are omitted, while the Scottish Dee is included. These are details no doubt, but they weaken one's confidence in the production. A 44 page index accompanies the chart, but the index is of little use. Places given on the map cannot be found in the index, and numerous places in the index (lat. and long. statistics) cannot be found on the map. The problem of a really good commercial chart is not solved by the present production, but it is only fair to say that the solution is brought a little nearer.

WALLACE E. WHITEHOUSE.

A SUMMER SCHOOL IN NORWAY, AUGUST 5–18th, 1922.

The Mediterranean Cruise has been Postponed to Easter, 1923.

During the Norwegian Cruise excursions to glaciers, &c. will be made, and, between calls, lectures and seminars on Oceanography, Navigation, the Physiography, Geology, Botany, and economic possibilities of Norway will be given, as desired, relieved by deck games, music, and dancing.

For illustrated booklet, and full particulars, please send 2d stamps to H. VALENTINE DAVIS, "Noddfa," Wistaston, Crewe.

Notes on Artesian Wells in the London District

J. P. LeGrand.

IN the ordinary way the general public never stops to think about water; one has just to go to the nearest tap, turn it on, and the water flows. Much spade work, however, has to be gone through in more senses than one before the above simple operation becomes possible.

By far the greatest part of London's water supply is under the control of the Metropolitan Water Board. Part of the water is obtained by filtration process from the river Thames and the river Lea, and enormous pumping plants have been installed from time to time, those at Chingford being particularly interesting and well worth a visit.

A further source of supply is from deep wells and boreholes. Quite apart from this, however, many private firms in London obtain their water direct, i.e., they have an independent water supply.

Let us suppose, for instance, that a building in Oxford Street cannot get a sufficient water supply from the Water Board. There would be various alternatives—(1) to collect rain-water, (2) to sink a dug well, (3) to bore an artesian well.

The first proposition can soon be dismissed, for even if special collecting tanks were arranged, the quantity obtained would be very small and doubtful (London's average rainfall is about 24 inches per annum), and the amount of ammonia, sulphur, etc., dissolved in the water, besides other impurities, would be so great as to make the water quite unfit for drinking without special filtering apparatus being installed.

There are the alternatives (2) and (3). To dig a well in order to obtain water in London would be a laborious and costly process unless an exceptionally large quantity of water was required, in which case "headings" would probably have to be dug. Headings consist of passages cut more or less horizontally into the underground strata, generally in the direction of the "strike" of the rock, so as to cut as many underground water sources as possible.

The headings all lead into the well itself, so as to augment the supply. But from a practical point of view a borehole or artesian well is the most usual proposition for domestic water supplies.

The borehole may be anything from 4in. to 24in. diameter. If carefully bored it should be perfectly vertical and straight. It is quite possible to bore with a deviation of only 1in. to 2in. in a vertical distance of 150 feet deep.

The borehole will not stand of itself, i.e., it would collapse or fall in if some steps were not taken to prevent this, and the most usual method is to line the bore as the work proceeds with steel tubing. The latter generally is made up in lengths of about 10 feet, and the tubes are screwed together by means of steel sockets; fresh lengths of tubing are screwed on and driven down into the ground as the boring proceeds.

On starting the boring at first a bed of gravel would very probably be met with, and it is also possible that some water would be encountered in the gravel. This, however, is quickly shut out by the "well borer" (as he is called) driving the tubes down into the underlying clay, which is always to be found at no great depth. This clay (known as the London clay) has a thickness frequently of 100 feet, but more or less according to the locality. It is in this great mass of clay that our London Tube Railways have been excavated. It is quite waterless and ideal material for tunnel making on the tube system.

Boring on below the zone of the tubes, however, the well borer at length finds a change in the strata, and once more comes on to gravel and beds of pebbles intermixed with another stiff bed of clay with variegated colours. This clay is known as Mottled Clay. Sometimes water is to be found in these beds, but it is generally regarded with suspicion, and shut out by means of the tubes mentioned above that have been driven down through the London Clay. By the time this spot is reached, however, the tubing becomes harder and harder to drive, until finally it will travel no further. (The tubing is driven by means of a heavy weight known as a "monkey." This difficulty is overcome by inserting a slightly smaller tube which just passes down inside the tier of tubes, and the work of boring is carried out by slightly smaller boring tools.

Shortly below this point we meet a sudden change in the strata, and it is here that care and skill are required. An extremely fine bed of sand known as the "Thanet Sand" is met with which blocks up the borehole immediately, not only so, but it frequently rises up the lining tube itself, sometimes several feet. When a sand bed does this it is termed "blowing sand," and the trouble is caused by hydrostatic pressure forcing the sand upwards. However, by careful manipulation of the boring tools the tubing is eventually forced down through this bed until the "chisel" (as the boring tool is termed) strikes something hard, and the shell tool (i.e., the tool used for removing the debris broken up by the chisel) reveals that a bed of curious green-coated flints has been struck. Immediately after this (for this bed of flint is seldom more than a few inches thick) it is found that the boring tools come up white, proving that chalk has been struck. This chalk bed is most important, for it is the source of the real supply of pure water. The bed is generally as much as 600 feet thick, but it is usually necessary to bore only 200 feet into this strata to obtain all the water required. In fact, it is a doubtful point whether any more water is obtained after the first 200 feet of the chalk have been penetrated. Boring in the chalk is generally a simple matter, but occasionally a large flint will completely block up the borehole, and a special tool called a "crusher" has to be put down in order to smash the flint by repeated blows. The boring tools are raised and lowered by boring rods, which consist of strong iron bars screwed together in lengths of 10ft.

No borehole is, however, really safe until the tubing has been driven right past the Thanet Sand mentioned above into the chalk. The tubing is generally forced at least 10 feet below the sand bed into the chalk. If this is not done, there is a great risk of the sand finding its way into the borehole, the inevitable result being that the moving part of the pumping machinery suffers considerably, as this sand is almost as destructive as emery powder.

Having reached a depth of approximately 400 feet, it is now necessary to insert what is known as a deep well pump, in order to bring the water to the surface, the water normally standing about 150—200 feet below the ground level.

As much as 6,000 gallons per hour can easily be raised out of a 12in. borehole from a depth of 200 feet by means of a deep well pump, but a still greater quantity can be raised by means of an "air lift pump," that is, the water is raised by forcing down compressed air, which so aerates the water that it bubbles up to the surface in more or less a continuous stream somewhat after the manner of soda water from a syphon.

The question will probably arise, "Where does this water come from?" It obviously does not soak down from above, as the thick bed of London Clay entirely precludes any such possibility. In order to trace the source of this water it would be necessary to travel a considerable distance, several miles, in fact, either north or south, where the great chalk bed out crops or comes to the surface. This chalk will be found along the valley of the river Lea and around Pinner and Denham and as far north as the Chiltern Hills, which form an imposing northern chalk escarpment. In the south it is again to be met with round about Addington, Sutton, parts of Croydon, Woolwich, etc.

A large proportion therefore of the rainfall in these districts descends into the chalk and gradually travels downwards along the lines of least resistance until it finally comes to rest, and would remain there unless artificially drawn upon by an artesian well.

It is sometimes found that two boreholes quite close together, i.e., within 100 feet from each other, will yield totally different results on pumping. One well will give an excellent supply, while the other well practically yields no water at all. The reason is that chalk (unlike sand, gravel, etc.) cannot absorb water, but the water has to find its way through the innumerable cracks and crevices and joints which abound in the chalk. This means that if one is unfortunate enough to put down a borehole where the chalk is more or less homogeneous or of a sticky nature, the result is likely to be poor from a water-producing point of view. On the other hand, hard clean block chalk full of partings will nearly always yield excellent results.

Water from the chalk formations generally has a hardness of about 18 degrees on an average, but in some parts of the Metropolis (generally near the central portions) excellent soft water is obtained with a hardness as low as 4 degrees. At first sight it is not clear how water from the chalk can be so soft, but it is now generally accepted that the softness is due to the Thanet Sand, which, being in direct communication with the chalk, frequently allows an easier passage for the water during its underground progress, and the water thus passing through the sand for a considerable distance, undergoes a chemical change, with the result that it becomes considerably softer. This is a great advantage to factories and laundries where soap is used or boilers are employed.

In nearly all parts of London it has been found that the underground chalk water level has been falling for many years, sometimes as much as 5ft. per annum. This is solely due to the fact that water has been drawn from the area artificially by means of artesian wells faster than the natural flow from the outcrop. If the present state of affairs continues, it will be only a question of time before other sources of supply will have to be looked for. This state of affairs, however, is happily not likely to occur for many years to come.

[The above notes, prepared in the first instance for the benefit and interest of members of the Association's Westminster Branch, are given here because they may well be used by teachers who already so often treat of the growth of London in its relation to the development of water supply. They give a touch of actuality to the water problem, and the teacher who wants to use last season's water crisis as a basis of work should collect the main facts of the historic development of London's water supply in the past, and go on to the problems of a possible future supply from Llangorse district in Wales.]

The English Homeland. By JANET S. HAIG. pp. 160, 7½in. x 5in. 2/3. McDougall.

A book of this kind for children aged 10—12 will be welcomed by teachers who need a cheap, sound and interesting book to put into the hands of their pupils. The author arouses interest both by her scheme of work and by the introduction of carefully chosen passages from well-known authors, while there is a pleasing attempt to treat the evolutionary side of the subject. The illustrations are good and add considerably to the value of the book, but there may be differences of opinion as to the value of the inclusion of the so-called Geographical, but rather Topographical, Summary and of passages which attempt to inculcate moral truths. H.A.W.

The Distribution of the Greek City States.

J. L. MYRES,
Wykeham Professor of Ancient History, Oxford.

THE civilization of Greece and Rome, like all other human achievements, has its geographical distribution in a terrestrial region, as well as a historical sequence in a period of time. In the same way as it is conceived by the historian as a process of development beginning in a period of obscure turmoil between 1200 and 1000 B.C., rising to a climax of political, philosophic, and æsthetic activity in the fifth and early fourth centuries, and transforming in succession the cultures of the Near East, and of the Romanized West into a common tradition of ' classical ' civilization, which remained dominant for nearly eight hundred years ; so, for the geographer, it is an attempt on the part of the human population of the Mediterranean region to " live well " under the peculiar physical conditions of that region, extemporizing in an Ægean cradleland a form of society, the Greek polis or ' city state,' exceptionally constituted for mutual defence and support of its members, and for the development of the natural resources of that cradleland ; propagating such ' city states ' coastwise over large stretches of similarly constituted country outside the Greek archipelago ; and eventually finding means to penetrate, with similarly organized communities, wide continental areas of the Near East. The Roman municipal system, for the geographer, stands in analogous relation to the physical surroundings of early Italian communities, and undergoes analogous extension around the western basin of the Mediterranean, and as far as the Atlantic seaboard, from the Straits to the Rhine. In both cases, the limiting condition for the spread of such communities beyond their home-lands, was the supersession of earlier regional dynasties by the military dominion of Macedonian adventurers in the East, and of the senatorial nobility of Rome in the West ; the eventual failure of both régimes to retain the confidence and co-operation of those communities enforcing eventually the co-ordination of the regional ' provinces ' so created, first under one central administration at Rome, and eventually under two at Rome and Byzantium ; and the adjustment thereby of urban and non-urban interests in each region.

Within this longer sequence and wider survey, the development and distribution of the Greek City States offer special problems of their own. Here we have a rare example of a well-marked type of social and political organization, of whose origin the place, date, and limiting external circumstances are approximately known ; in the sense that there is no earlier trace of any similar societies in the Greek cradleland ; and only partial analogies anywhere else, either during this period of history or at any other. The very word ' polis,' when it occurs in the Homeric poems, which purport to describe the state of things in the Ægean just before the general ruin out of which the ' citv states ' emerge, has no ' political ' signification as yet : it means a fortress, not a community ; and as no other word replaces it in the Homeric vocabulary, it may be inferred that the thing itself—the ' city-state ' of Hellenic times—had not come into being as yet. Now, the Hellenic exploitation of the Ægean archipelago, and of the areas of Greek colonization outside it, has been shown by the discoveries of two generations of archæologists, from Heinrich Schliemann to Sir Arthur Evans and his fellow-workers, to be no primitive or original adventure, but in great part a renascence, and a recovery of ground occupied once already under an older régime. Comparison, that is, of the distribution of the home-land settlements of the Minoan bronze age civilizations, and of their eventual colonies in the Levant and in Sicily and South Italy, with that of the earlier Hellenic cities, reveals notable analogies ; and such legends of the more audacious adventures of the sea-raiders of pre-Hellenic times, as the Odyssey and the

Argonaut story, indicate that the directions in which opportunities of expansion were being sought toward the close of the earlier epoch were precisely those in which the later Hellenic emigrants achieved their most signal successes, namely, beyond the Bosporus, and around and beyond the narrows leading into the Western Sea.

On the reasons for these analogies, some light is thrown by the striking irregularities of the distribution of the Greek City States. Contrast for example, within the Greek Peninsula itself, the spread of such states as far north as the Thessalian plain on the Ægeanward side, with their almost total absence on the western side of the divide, north of the gulf of Arta ; the contrast being the more striking if we remember that nearly all the city states on this side, north of the gulf of Corinth, are not indigenous organizations, but colonial settlements unusually closely linked throughout their history to a single mother-city, Corinth. Here the Hellenic situation anticipates very closely the modern contrast between the Greek occupancy of Thessaly and the strong Albanian element in the population of Epirus, Acarnania and Ætolia, and is itself anticipated by the Minoan distribution ; for Minoan sites—very late and sporadic, it is true—are found in south-eastern Thessaly, while on the west side they seem to be restricted to the islands, and are rare and late even in them.

East of the Ægean, in the same way, there is a dense semée of city states, large and small, along the Asiatic coast and its island fringe from Rhodes and Cnidus to the Hellespont, and thence, though not quite so frequent, along the Asiatic shore of the Marmora to the Bosporus. But on the northern shore it is different. Only the Chalcidic promontory, half insulated by lake and fen from continental Macedonia, has anything comparable to show, and even here the Chalcidic states are secondary and colonial, not part of the primary series of Greek cities. For the rest, the Thracian seaboard had to wait till the sixth century for Greek colonists ; the Paeonian frontage around the Strymon mouth until the fifth ; and the Macedonian coast was not directly ' colonized ' at all, but was Hellenized gradually, under its native rulers, by intercourse with the Chalcidic cities across the bay. Limiting factors here are in the first place the severer climate (for even the Chalcidic forests are mainly deciduous), secondly the dearth of ports, and of small alluvial areas, resulting from the bold configuration of the Rhodopè highland, and the consequent concentration of the drainage system into a few major outlets, Hebrus (Maritza R.) to the east of Rhodopè, Nestus and Strymon to the west ; but most of all to the circumstance that whereas Asia Minor formed in early times a large appendage of the Euphratean culture area, and achieved repeatedly organized civilizations of its own, around the Hittite states of the plateau, and around the Lydian goldfield in the Hermus valley, ' Europa Minor '—to coin a term less grotesquely inapplicable than the politician's nickname of ' Balkan Peninsula '—lay far too remote from Babylonia, and even from Pteria and Sardis, to be civilized early from the Near East, and far too exposed to disturbance by successive inroads from the steppe and the Hungarian plain, to develop any but the crudest rule of force under dynastic chieftaincies insecurely dominant over merely tribal societies. Even the goldfield in the Pangæan hills, east of the lower Strymon, lay so far from the only considerable Thracian dynasts, and was so strongly intrenched by the Strymon fenland against Macedonian aggression, that it was only with the rise of new conditions in the Hellenic Ægean at the end of the sixth century that it comes into history at all.

Outside the Ægean, the contrast is no less striking between the importance of the Greek settlements around the Black Sea and the rarity and insignificance of those on the shores of the Levant. In the north, in spite of the severer climate, the fundamentally different configuration of the steppe-foreshore, and the totally alien mode of life of the nomad Scythians, colonies (all due to the enterprize of a single Ionian state, Miletus) were numerous and successful. Their foundation hardly goes back beyond the seventh century, and their prosperity begins when, in addition to trade in furs, backwood timber, and probably also gold from the far north-east, the unprecedented discovery was made that in Scythia corn could be " grown for sale," in excess (that is) of the producers' own consumption. As the main incentive to colonization had been the excess of population over corn production in the narrow oasis-like alluvia and terraced foot-hills of the homeland within the mountain zone, abruptly limited and secluded by wastes of karst limestone or old crystalline horsts ; and as the sole alternatives in agriculture were the characteristic Mediterranean tree-fruit crops, olive, vine, fig, and the like, which are precarious everywhere in the Euxine—and the olive unknown except on a few sheltered foreshores of Asia Minor—there were all the elements here of highly profitable interchange of produce ; with immediate relief from food-dearth, rapid expansion of textile and other industries—for the Scythian market seems to have been almost insatiable—and no less rapid growth of the urban population, now that food and work were alike assured. It was in fact the first anticipation of modern industrial society ; and the contemporary spread of the Lydian invention of currency, which rendered wealth for the first time portable, negotiable, and accumulable without risk from moth or rust, gave capital its first open career ; for as the new wisdom of that age phrased it, ' money makyth man.'

It was part of the same adventure that other daughter cities of Miletus, at Samsun, Trebizond, and Batum, for example, tapped the copious silver and the long-legendary gold of north-eastern Asia Minor, the ' bright iron ' of the interior (which had heretofore passed laboriously across country to Phœnician Tyre), and the boundless forest-products of Armenia and Caucasus. And it would seem as if the eastward traffic in Ionian manufactures by way of Sardis had its supplement in southward trade from these Pontic ports into the Phrygian and Cappadocian plateau-states.

On the south side of Asia Minor, and on the Syrian coast (which from the standpoint ofMiletus and its Ionian compeers seemed a southern counterpart of Trans-Caucasia), things were very different. The Black Sea, it is true, had had its Argonaut raiders seeking ' golden fleeces '—a primitive anticipation of the grease-process—from the auriferous stream-beds of Colchis ; but it had suffered no such Berserker devastation as the Minoan and Keftian communities of the Levant endured from the ' Sea Raiders ' of the thirteenth century and from the great ' Land-Raid ' of 1197, which was halted only on the Palestinian threshold of Egypt. It was small compensation that the Philistine survivors of that first battle of Gaza were settled by their Egyptian conqueror in the coastline which bears their name. With better luck they might have made it another Ionia ; and indeed there is some reason to suspect that the reorganized Phœnicia which appears on the morrow of the ' Land-Raid ' owes some of its initiative and oversea experience to similar waifs from the ' Sea-Peoples.' But the new Israelite occupants of the Judæan highland gave Philistia no rest : ' Saul slew his thousands and David his ten-thousands ' : and the superior harbourage of the Lebanon foreshore, which had remained in Canaanite hands, decided the issue of this first anticipation of the Crusades. Even Cyprus fell in part into Phœnician hands, and further north the ancient and wealthy communities around the Gulf of Alexandretta—the Kefti-folk of Egyptian tribute-lists—seem to have been broken utterly by the ' Land-Raiders.' Further west, too, along the south coast of Asia Minor, an almost total absence of foreshore, and arduous passes landwards condemned the minute maritime communities around the Gulf of Adalia to eke out pasture and fishery for piracy rather than commerce, for indeed they had nothing with which to trade but unlimited timber, to a world where most forests were virgin still. Sea raiders they had been for centuries already, and sea raiders they remained till the strong hand of Pompey reclaimed them, a thousand years on.

Egypt, of course, had been in intermittent contact with Ægean peoples since very early times, sometimes by way of interchange of products and materials, occasionally in more violent collision of sea-faring raiders with Egyptian coast-defence, as in the troubled thirteenth and early twelfth centuries. The renewal of intercourse, when Greek adventurers were exploring the Levant anew in the eighth and seventh centuries, partook of both qualities. The "bronze men from the sea" who co-operated with Psammetichus to liberate Egypt from the Assyrians in 664 B.C., came fully armed, as the oracle foreknew, but once admitted, they formed trading factories at the 'Bay-Tree Post' and the 'Port Miletus'—how like the nomenclature of New England!—up the dull "Mud Creek" which gave its name to Pelusium. Beyond the fens, of course, Egypt was full of its own folk; even in "D-River Flats" (if we may paraphrase the namesake of all 'Deltas') there was eternal trouble with riparian ranches, as Odysseus had had with the Laestrygones; and it was to everybody's comfort that King Amasis, a century later, shut down the factories and laid out the first 'treaty-port'—let us translate Naukratis, too, as Notre Dame des Flottes, Seynte-Marye-atte-Prowe,—with its many particular hospices, and the first 'All Saints' dedicated at large to "the gods of the Greeks," lest any wanderer find himself out of heaven's keeping there.

Cyrene is a different story, the best authenticated instance of that general surveillance of his people's welfare which antiquity ascribed to Apollo in Delphi, and some moderns allow to his priests. Despite indifference, ignorance, and ill-luck, that most uniformly prosperous of Greek ventures found itself within a century overpeopled with immigrants from all parts, and with political sagacity very rare in Greek city-states—and this time only partly Delphic—incorporated them all, and became besides metropolis of numerous other cities hanging on the steep plateau edge, around the vents from its swallow-holes. Its wealth was in fisheries and sponge-diving, in the monopoly of a wild herb, silphium, without which no Greek household was complete—California has the nearest modern parallel— ; but most of all in the countless sheep of the plateau, which made its hinterland the Darling Downs of antiquity.

It would have been natural to expect that with Sicily on the one hand and Cyrene on the other, the coast of the African Tripoli would have shared their fortune and fame. But here, Carthage lay too near, and Phœnician enterprise was beforehand, so that the mismanaged emigration planned unofficially in Sparta about 515 B.C. failed from the outset, and only a chance allusion suggests that any attempt was made to retrieve it.

In Sicily, on the other hand, Greeks met Western Phœnicians on more than equal terms, at all events until the colonizing movement had spent itself, and the Persian diplomacy of Darius I. took a hand in the game. Minoan settlements have been identified on a number of sites around the great western bight, from the heel of Italy to the south-east angle of Sicily, and though most of them succumbed during the Dark Age to land raiders and sea raiders, much like those of the Levant, Tarentum at all events struggled right through the bad times, and Delphi for one (and perhaps other old sanctuaries also) had knowledge enough to give sound guidance when the colonizing movement began.

At first, as in the partition of our 'New World' between Spanish and Portuguese enterprizes, some sort of demarcation seems to have existed between the mandates of those two Greek cities which most interested themselves in new western projects out beyond those 'Achæan' cities which are the western counterpart of the Ionian group, and were already ancient in the seventh century—perhaps even decadent and in need of reinforcement or reconstitution. Corinth's colonies, at all events, are all south of the Symaethus river, which enters the sea midway on the Sicilian frontage; while all those founded from Chalcis—except Leontini, which was a secession from Catana, and had perennial feud with its mother-city—lie north of it, and extend beyond Messana as far as Himera (near Termini) on the north coast. Chalcidian adventurers were held up here by a Phœnician post foreclosing what had been "Every Man's Anchorage" at Panormos, the modern Palermo: what a chapter of stirring detail lies buried in that word! So later Chalcidian ships stood in the starboard hand as they passed "Old Swallow-all," the bad eddy in the Narrows, and found at 'Mermaid's Rock,' another bad bit off the Bay of Naples, that Odysseus had been before them, just as the ballads said. One more change of course, and a cove opened so like their own Kyme at home that they named it so, and found rest; and from Cumae (in its later Italian spelling) the new town (Nea-Polis) was founded later, which preserves its name in Napoli.

Controlling the Narrows as thev did, through their settlements at Messana and Rhegion, Chalcidian adventurers could choose their own associates for voyages further afield. Chief among these, for political and presumably economic reasons which elude us, were Samos, which occupied the Lipari group, and was to reinforce Messana later on, and Phocaea, which had, all to itself, anything that was worth having after you had 'run the gauntlet' up the coast of the Tyrrhenian sea-rovers, as bad a crew of infidel ruffians as the Sallee pirates of Robinson Crusoe's day; which meant that they had had a long monopoly of these waters, preferred to manage their own business in their own way, and neither spoke Greek nor wanted Greek visitors. They had a rough-and-ready way of indicating 'no hawkers allowed.' Beyond the Arno, things were as bad, for the hill-men neither wanted to buy anything, nor had any produce to sell; but from Genoa to Marseilles, and Marseilles to the big factory at Ampurias, was a trader's paradise, and a country, too, more like the best bits of Greece than you could imagine lying so far afield. And away beyond the Ebro lay the Copper Country (with a friendly chief and obliging people), and beyond that the Silver Country; only one met people working round by the south-way from Carthage, out there; and if so, look out for trouble!

Corinth's prospects were easier. The Chalcidians had Etna—a fretful neighbour—all to themselves; the better road into the interior was (and is) on the south bank of the Symaethos; and the south country is a garden of the Lord; Demeter's grain and the flowers of Persephone equally copious in their season; cattle on the pastures like the oxen of the sun in the ballads, and sheep worthy of the Cyclops. The rocks he threw after Odysseus still lie off shore at Naxos. But the Corinthians had not things quite their own way. Neighbours from Megara, across the Isthmus at home, and Dorian-speaking consins from Rhodes and the further islands of the Ægean, pushed in before it was too late, and occupied districts along the south coast which might with better luck have been Corinthian. The result, with converging hinterlands, was a complicated situation not unlike that which we can remember in the southern half of Africa.

To follow in detail the competing interests and efforts which this general distribution of settlements permitted to develop, would outrun the limits of this sketch. All that has been attempted here is to anatomize the distribution itself; to trace home the component elements of the circumference of the Greek expansion to their origins nearer the Ægean cradle; and to suggest how these various enterprises were made possible by the broad geographical features of the coastlands which they mainly followed. The eventual inland spread of similar foci of Greek civilization, after the hinterlands were thrown open by the military genius of Alexander, is a subsequent and wholly different question.

The Value of Regional Geography.

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ABOUT a century ago, Karl Ritter won the title " Father of Modern Geography " by his attack on the encyclopædic study of facts of geography. He urged that this meaningless, formal study of geography be replaced by a study of the influences of physical forces on life. This conception gave a new meaning, broader purpose, and dignified the study of geography by recognising the rational element as the one most important. The earth now came to be studied as the home of man. It was now essential to learn what facts were earth influenced and therefore significant. Henceforth geography could be taught so as to make pupils think. No subject lacking in situations demanding reason and imagination, can make a strong appeal to the human mind. The memory " crazy quilt " type of geography teaching is still common in our schools, and accounts for the general dislike and lack of interest pupils manifest in the subject. It is not to be inferred that vital facts are to be neglected. They will be presented as explanatory of other facts, and will be grouped naturally in support of broad generalizations. Even more facts than now taught can be retained if properly associated in an interesting way. We have followed a faulty psychology in drilling pupils on unrelated geographic material.

THE NATURAL GEOGRAPHIC UNIT.

A geographic region is delimited by its somewhat similar conditions of temperature, rainfall, surface, minerals, soil, and such factors. Under such conditions definite forms of vegetation, animal life, density of population, occupations and modes of life prevail. Political geography tends to isolate facts from their causes ; physical geography, properly humanized, tends to relate these bits of information. The natural geographic area is the logical unit of organisation. Political areas may reflect but the fortunes of war or the skill of diplomats. Natural areas offer a basis for causal geography. A few large geographic regions will cover any continent, and their treatment saves time and avoids mental confusion. Only recently we studied small political units noting separately facts of surface, climate, drainage, products, etc. Our late geography teaching emphasises large geographic regions, physical, climatic, human and so on, and shows the response of life and industry which the region brings about.

The teacher, who wishes to organise her work on the regional basis, must determine (1) what regions to present ; (2) what method can be used to make it concrete and interesting ; and (3) how to submerge fact study in developing broad generalisations.

The region selected should show man's dependence on or response to nature. Definite life responses are associated with such natural geographic areas as the Barren Lands of Canada, the Great Plains, the Great Lakes Region and the South. South America presents some strong regions as the Amazon Basin, Argentine Plains, and the Deserts of Peru and Chili. Africa offers such types as the Nile Valley, the Sahara, the Soudan Grass Lands, the Congo Jungles, and the South African Deserts and Plateaus. In all such regions, interesting human adjustments are in evidence.

Some industrial regions can be recognised, but there is always a physical background for each great occupation. The manufacturing area of the United States is east of the Mississippi, north of the Ohio, and includes New England, New York, Pennsylvania, and New Jersey. Most of the reasons for its location are natural resources of soil, coal, water power, iron ore, water transportation, and forests. The human factor of immigration has also strongly favoured this location. The South is dominantly agricultural as a result of long seasons, fertile soil, and abundant rainfall.

It is more difficult to locate crop regions, for we find that a crop is not always grown where physical conditions favour it. Such is the condition in California, which is ideal for wheat, but more profitable crops as fruit and alfalfa are grown instead. On the contrary, an industry may be important in a region somewhat unsuited to it, as sheep ranching in Australia. Generally speaking, however, each cultivated crop as date, olive, sugar beet, celery, rice and others are grown where nature generously rewards man's efforts.

A region may often be best studied through its typical city. Here the influence of environment is shown in the wealth, typical industries, and rate of growth. The pupil should study the factors producing Chicago, New York, Pittsburgh, and other large cities. It may be stated as a problem as—Which of the following cities will develop most rapidly: Seattle, Los Angeles, or New Orleans?

Method of Presentation.

The second problem of the teacher is, how shall the region be presented? Mainly from the child's instinctive interest in the life of the people. The physical serves only as an essential background to be used when needed to explain human conditions. Many teachers present facts of surface, climate and drainage for their own sake. In the lower grades difficult earth relations cannot be understood, but are implied as, "reindeer feed on moss where it is too cold for grass," or the "Eskimo eats the flesh of bear and seal, as it is too cold to grow grain, fruit or vegetables." The child sees that the camel is suited to desert conditions and that dogs are adapted to the frozen north. Each region should form a picture in the child's imagination. To this end, maps, pictures, products, and striking descriptions should be freely used. An example of a physical area presented by the project method may be briefly shown.

Project. Why are the Great Plains from the 100th meridian to the base of the Rocky Mountains sparsely inhabited?

I. Problem. What is the history of this region?
   1. Explored by (a) Lewis and Clark, (b) Zebulon Pike.
   2. Well described by Parkman in 'The Oregon Trail.'
   3. Give a description of the Indians, buffalo, pioneer life.
   4. The failure of corn due to droughts, grasshoppers, hot winds.

II. Problem. To study the physical features and natural resources to learn what occupations are possible.
   1. Rainfall. Consult map. Explain. To what crops adapted?
   2. Is irrigation possible? Sugar beets. Alfalfa.
   3. Region well suited to grazing. Nutritious buffalo grass.
   4. Forest map. Is lumbering possible? Pioneer sod shanties.
   5. Soil fertility shown by large crops in moist years.
   6. Minerals. Use maps. Insufficient for large mining enterprises.
   7. Is manufacturing possible? No raw material, coal or water power, no water transportation, distant markets, and few labourers.

III. Problem. To see if this semi-arid region can be made to support a dense population.

1. Science does not teach that rainfall can be increased by ploughing land, planting trees, etc. What can be done?
2. How much can be irrigated? See irrigation map. Discuss methods of irrigation. Describe the Arkansas, Platte and Missouri rivers.
3. Does the occupation of grazing call for many or few people?
4. New crops suitable to the region as Durum wheat. Kaffir corn, Sudan grass, etc., have been introduced. Discuss effect.
5. Is the region suitable to tree crops of any kind?

On the sand table make a ranch, alfalfa farm or sugar beet field. Study pictures, noting wind mills, corral, etc. Write simple stories of life in the region.

In conclusion, does regional geography assist in building up important generalizations? The experience of the past shows that unrelated bits of information taught as geography are of little value and are readily forgotten. Much of the time given to the subject has been wasted. Pupils have lacked interest and teachers enthusiasm. The fault has been a lack of organization. The remedy is regional geography taught through problems and projects. The socialized recitation develops initiative, co-operative spirit, and stimulates thought. The teacher must aid in finding geographic laws and making important summaries of worth while knowledge. The region must be studied causally and visualized accurately. The teacher must be a master of word picturing to aid the child's imagination. Pictures and maps should be freely used. The fundamental principles of man's dependence on nature and human interdependence in society must be clearly recognised.

Physical Wall Map of S. Africa. Orographical colouring. 1 : 1,400,000. 180 x 110 cm. Dissected and mounted on cloth, eyeletted. Bartholomew's. £1 1s. 0d. Also in two unmounted sheets 10/6, and mounted on cloth, varnished and with rollers £1 10s.

This is a finely executed wall map, invaluable for the teacher taking a special course on the subject of South Africa. The towns and railways are given in red spots and lines, the names being in black; the rivers are conspicuously marked, and perennial streams are marked differently from merely seasonal ones. The railway lines often help to make the orographical facts stand out, and the colouring is so adjusted as to bring out the great altitude of Basutoland as well as of the plateau east of Johannesburg. The map stretches just far enough north to include the railway from Swakopmund to Windhoek and the course of the Limpopo.

The Scope of School Geography. R. N. Rudmose Brown, O. J. R. Howarth, and J. McFarlane. Oxford Univ. Press. 1922. 158 pp, 13 x 18.5 cm, bound. 5/6.

Personality is the prime quality of a teacher, and it is clear that educational organisation must be modified so as to give that quality more play, but personality isolated is always in danger of losing perspective, and herein lies the value of such a book as the one under review. It is a thoughtful exposition of the point of view of the progressive but still orthodox teacher, and should help anyone in doubt to decide how far to include or to exclude matters which might be called geological, historical, and anthropological. It will be a recommendation of the book to many readers of this journal that the influence of Herbertson is found on almost every page. One regrets a lack of emphasis upon the educative value of great books like Doughty's Arabia, Huc's Travels, Prescott's Mexico and Peru, many volumes of Hakluyt and of the Hakluyt Society. Reading such books not only imparts a live interest in other parts of the world, it can also be made a valuable instrument for checking the present tragic development of universities as factories for turning out certified illiterates with honours degrees.

Geography Syllabus.

PADDINGTON AND MAIDA VALE HIGH SCHOOL.

C. E. CLEGG, Geography Mistress.

PREPARATORY.

FORM II. The points of the compass, and how to find them. Distance and direction. Plans of class-room and netball ground. Simple maps of school district. Duration of daylight, position of sunrise and sunset at different seasons. Kinds of clouds. Chart of the most conspicuous circumpolar stars. The geography of London. Life in other lands.

Books used: L.C.C. Elementary Atlas, Finch's Geography Stories.

Notes: The outdoor work is done in the playground and in Paddington recreation ground, as the season and the weather permit. Practical exercises are given on the atlas map of London, and the aim is to arouse a consciousness of geographical environment, observation of natural phenomena, and a sense of the dependence of ways of living on natural surroundings.

LOWER III. Clouds, wind, rain. Evaporation and condensation. Springs and streams. Simple contour maps. Walk over Hampstead Heath. Use of the scale, meridians and parallels, colouring, and other conventional signs on maps. Regional studv of the British Isles. The work of the sea.

Books used: Elementary Atlas, Reynold's Junior British Isles.

Notes: The children draw a simple contour map of Hampstead Heath from the blackboard, and we take a larger scale one with us. An attempt is made to continue the mere observation work of the Second Form and to explain it, e.g., the origin of clouds, the precise meaning of colour in relief maps, the cause of springs in certain places, the parts of a stream. The economic geography of Britain is brought home to the children by their drawing sections of a coal-pit and of a salt-mine from the blackboard, by discussing the materials of which their clothes are made, etc.

UPPER III. The continental shelf of Europe and the Narrow Seas. Routes to the continent. Regional study of Europe.

Books: Philips' New Comparative Atlas, Mackinder's Lands Beyond the Channel, and another textbook, under consideration.

Notes: More advanced contour maps are drawn this year, while studying the Alps, e.g., the contours of a mountain-pass. Types of climate are introduced by means of diagrams, drawn by the children in their note-books. The temperature and rainfall of typical places are given, and the children are led to make notes of the absence of summer rain in the Mediterranean area, the great range of temperature in Russia, etc. The outdoor expedition is to Harrow Hill, from which almost the whole of the Brent basin can be seen and contrasted with the wider view westward. A stream is followed from its source to its confluence with a larger tributary, and maps are drawn in the class-room. The study of our own coasts at the end of Lower III. year is the link to which is attached a discussion of the neighbouring seas and the lands beyond them.

FOUR YEARS' COURSE.

LOWER IV. The earth as a whole. The discovery of America and the circumnavigation of the globe. Regional study of North America, and (in less detail) of Central and South America and the West Indies.

Books: L. Brooks' America, Finch's Famous Explorers, Philips' New Comparative Atlas.

Notes: The causes of the changing seasons, the varying height of the sun and variations in the duration of daylight are associated with the study of lands extending through nearly all the zones, and time problems with the widely differing longitudes. Climatic graphs are continued, and new types of climate discovered. The use of isotherms is introduced. The use of the compass is explained, and the reasons for 15th and 16th century exploration are discussed. Special attention is given to land forms and drainage in studying North America, and the drawing of sections from contour maps is begun. The outdoor expedition is to Wimbledon Common. During the winter a visit is paid to the Geographical Section of the Science Museum, South Kensington.

UPPER IV. The study of Africa is begun by the reading of appropriate chapters from Finch's Famous Explorers and by discussion of the reasons for its undeveloped condition, and exploitation by white men. The continent is then studied regionally. The main facts about the ocean lead up to different types of islands, coral formations, and conditions in Australasia. Australia is compared with Africa with regard to its main geographical aspects. A survey of Arctic and Antarctic exploration is given, and the natural vegetation and animal regions of the world are illustrated by a visit to the Natural History Museum, South Kensington.

Books: Atlas and Finch, as before. Reynold's Africa and Australasia.

Notes: The Upper Fourth outdoor expedition is to the Colne Valley, near Rickmansworth. This affords views in chalk country, sections of the lower London Tertiaries and of the chalk in quarries, a walk along an unsymmetrical valley, etc. The use of isobars is introduced this year, and the elements of meteorology are associated with usual conditions near the British Isles and over Australia. Systematic use of the daily weather-chart begins in this form.

LOWER V. Asia—the monsoon regions in greatest detail. Revision and enlargement of previous studies in general physical geography—land forms, climatic regions of the world, vegetation zones, animal life, and the influence of all these on human life. The British Isles (general). Scotland studied regionally.

Books: Bartholomew's Comparative Atlas, Lyde's Economic Atlas, Unstead and Taylor's General and Regional Geography, Herbertson's "Man and his Work."

Notes: The outdoor expedition last year was to the North Downs—Reigate Hill and Box Hill, on a half-term Monday. An all-day expedition is aimed at in these forms. The girls of Lower V. keep charts of the barometer readings and of the rainfall for certain periods. While studying India a visit is paid to the Indian Section of the Victoria and Albert Museum.

UPPER V. England and Wales. Ireland. Regional study of Europe. Revision of all previous work from the point of view of the British Empire.

Books: The same as in Lower V. It is hoped to add shortly M. I. Newbigin's British Empire Beyond the Seas.

Notes: All previous practical exercises are revised in this form. A few lessons from Upper IV. upwards are devoted to debates on geographical subjects, and in Upper V. some of the work is done by each girl, or pair of girls, preparing speeches or papers on different parts of a subject. Upper V., and occasionally Lower V., are taken to lectures at the Imperial Institute and to topical lectures and moving pictures as these are given from time to time. The use of ordnance maps begins in Lower IV. and is continued and expanded as there is opportunity.

Two periods a week of 40 or 45 minutes each are given to geography in every form, except Upper V., in which there are three periods, and in Form VI., where there is only one. This Sixth Form work, in which both Arts and Science Sixth share, is merely additional to the advanced course subjects, and consists of a study of the following:—The historical geography of the Mediterranean Region; the history of discovery and invention, with special reference to map-making and improvements in means of communication; the evolution of the knowledge of the globe. Books: The Dawn of History (Myres), Jacob's Story of Geographical Discovery, and various reference books.

Early Maps of China and of the Mediterranean.

Florence C. Miller,
Assistant Lecturer, University College, Southampton.

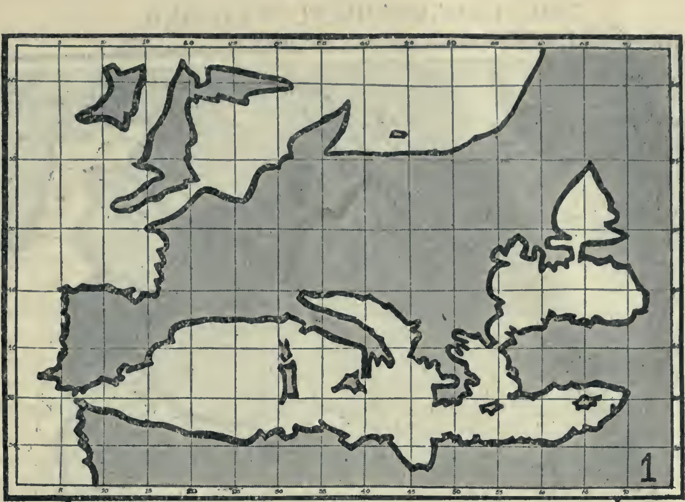
EURO-ASIA consists of Central Highlands and Northern Plains, surrounded by a fertile southern fringe stretching from Europe to South-East Asia. This fertile fringe has given rise to two contrasting types of civilization. The civilization of South-East Asia has been dominated by land and based on rivers, and its Chinese and Indian phases have been and are of world-wide importance. The civilization of Europe has been maritime, and has had two phases, a Mediterranean phase and a later North Sea phase. The contrast between East and West, between China and the Mediterranean, can be illustrated from mediæval maps produced in the two areas.

Chavannes (" Les deux plus anciens specimens de la cartographie Chinoise ") gives a short history of early Chinese cartography in which are indicated the character and uses of maps which were produced between the third century B.C. and the eleventh century A.D. All these are lost. The earliest extant were engraved 1137 A.D. on stone in a temple in the province of Shensi. This date is not the date of the making of the maps, which must be deduced from internal evidence. According to Chavannes the earlier (map 1) was made 1043—1050 by a geographer of the Empire of Ziau. This empire included Manchuria and part of Northern China. The date of map 2 is put at about 1100 A.D. A map of 1142 identical with map 2 has been discovered. It is known that this map of 1142 was based on an earlier one of 1100, which, presumably, was either the base or original of the engraving of 1137.

Although all the earlier maps are lost, enough is known from records to throw a little light on these two. Maps were unique, reproductions being generally forbidden. This accounts for the loss of so much cartographical work. Maps were made for the use of the ruler and his council, and were consulted during discussion on strategy and defence. Pei-Sieou, a cartographer (224—271 A.D.), laid down six principles of map-making. Not all of the six are explicable at the present time. Two are very clear. There must be exact orientation and correct mileage along roads.

An examination of maps 1 and 2 shows that behind them was a long experience in map making. Rivers were drawn with extreme care and accuracy. Geographical conditions made it certain that rivers and routes would interest the cartographer. Geographical conditions also made it certain that the coast and the sea would fail to attract. But the skill with which the data were translated into a map could only be the result of previous experience. Pei-Sieou had laid down two basic principles. His successors must have found them difficult to carry out. The flat map must err in direction or distance or both. In land maps, particularly those for military purposes, distance along roads or rivers has always been of more importance than direction. For this reason map 3—Modern China—has been inserted, for purposes of comparison, on an equidistant projection.

Many examples of Mediterranean map making of various dates are available. Ptolemy working in the second century A.D. left the data from which a map could be drawn. These facts were observations of latitude and longitude collected from travellers, mainly sailors, in and about the Mediterranean area. But Ptolemy's map (map 1) was not made, as were the Chinese maps and the portolan charts, for some specific and practical purpose. The latitudes of his map were fairly correct, but he made the Mediterranean stretch through about 20° of longitude too many.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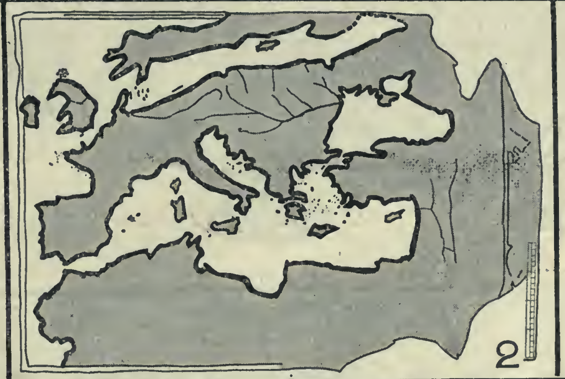
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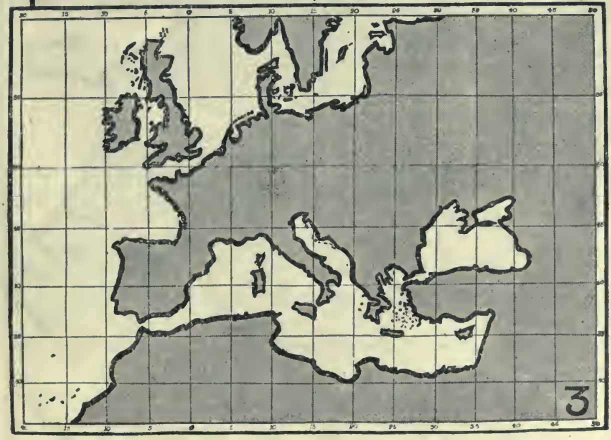
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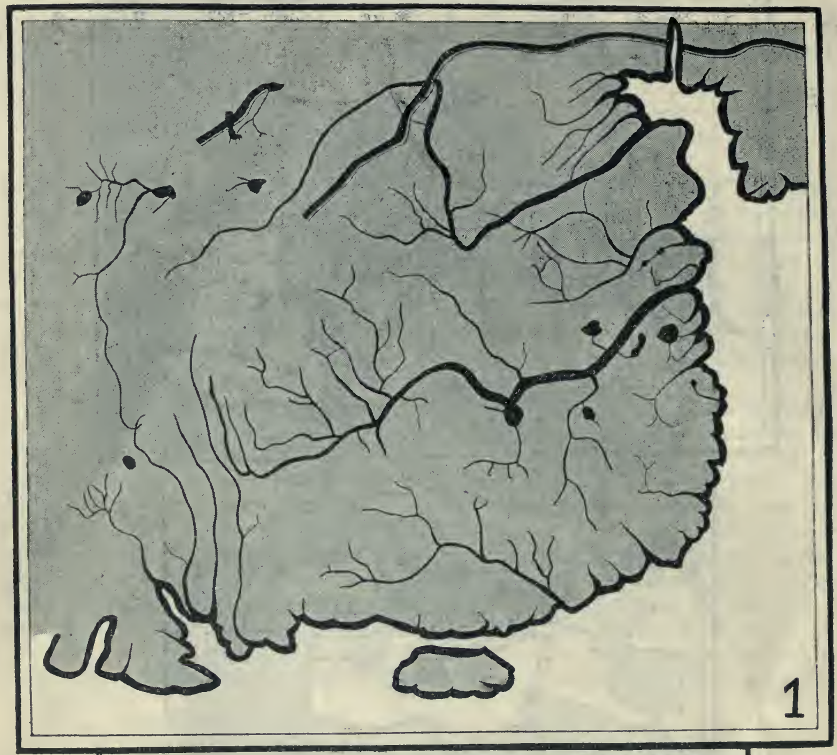

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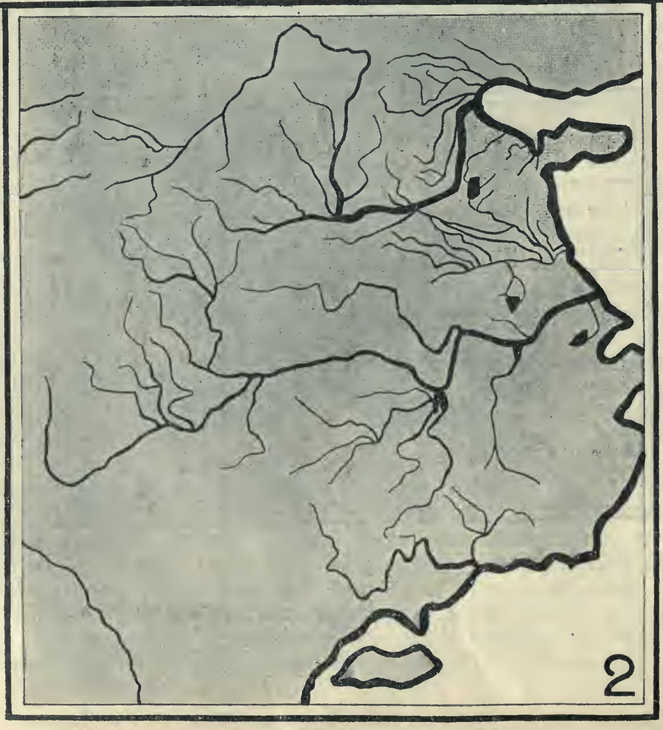
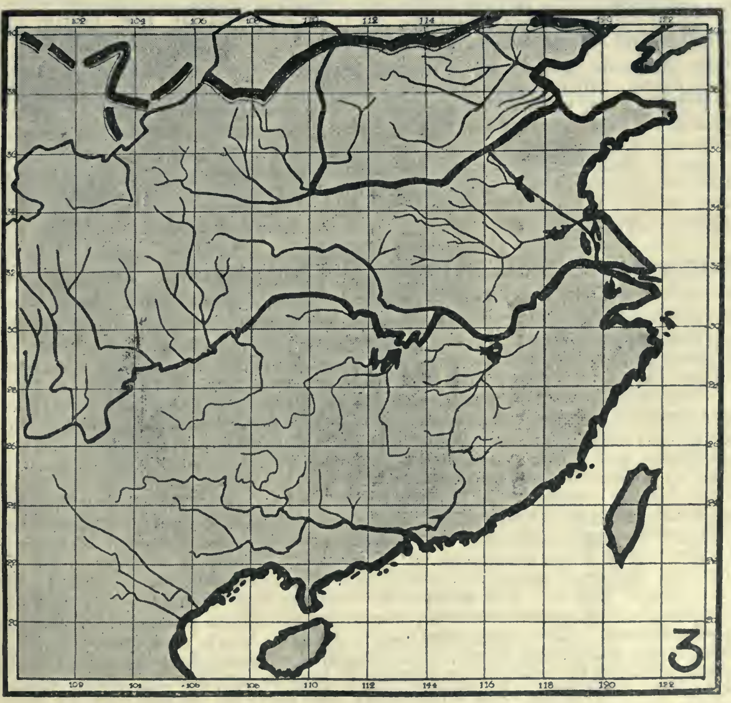


2

Great numbers of portolan charts still exist. The earliest of which the date is known is ascribed to Giovanni da Carignano, 1300 A.D. (map 2). Nordenskiöld, commenting on the resemblance which all portolan charts bear to each other, is of the opinion that by the middle of the 13th century there was developed a " normal portolan " of which all known examples are modified copies. Apparently they contained information similar to that set down in the earlier " portolani "—written sailing directions for navigators—but drawn out in chart form. Stevenson (Portolan Charts) says, " We find in the portolan the chief corner stone on which rest the charts here under consideration." These pilot books or sailing directions usually gave distances or directions, but the latter were more reliable and more useful to sailors than the former. The chart maker, probably a craftsman desiring to turn out a marketable article, realised that he would succeed best if he gave his customers a chart on which a straight line from point to point gave a true course. For this reason Ptolemy (map 1) and Modern Europe (map 2) have been put on Mercator's projection for comparison with each other, and with the projectionless Carignano (map 2).



3

The representation of Europe by its people is in striking contrast to the representation of China by its people. In the European area the chief observations were made along coasts. Rivers and mountains were of little account or interest compared with capes, bays, islands. In the portolan chart, at least, direction was more important than distance. Many copies of it would be made for the use of sailors bent on trade. In the Chinese area the chief observations were made on land, possibly by pacing and other time-distance devices. Coasts were of little interest compared with rivers and towns. Distance was probably more important than direction. The maps were not generally obtainable, as they were for military purposes. The Chinese maps and the portolan chart have one point in common—they were all made for practical ends and with specific purposes.

In conclusion, the thanks of geographers should be offered to Colonel Dudley Mills for his public spirit in placing his fine collections illustrating the development of cartography at the disposal of students. It is greatly to be hoped that means will be found to use his maps, and reproductions of them as well, for educational and research purposes far and wide. His valuable suggestions are much appreciated.

Among books of special value for the study of old maps may be mentioned :—

Tozer, H. F., " History of Ancient Geography."

Beazley, R., " Dawn of Modern Geography."

Chavannes, Ed., " Les deux plus anciens specimens de la cartographie chinoise," extrait du Bull. de l'Ecole francaise de l'extrême Orient," Avril—Juin, 1903.

Nordenskiöld, " Facsimile Atlas."

Nordenskiöld, " Periplus."

Stevenson, E. L., " Portolan Charts."

General Map of S. China. } Published by the Tokyo Geographical Society.
Geological Map of S. China.

These fine maps sent by Mr Kinosuke Inouye, Director of the Imperial Geological Survey of Japan, will be found invaluable for research purposes. They are on the scale of 1 in 2,000,000 and measure 95 x 65 cm. The geological map will be found most illuminating for any study of the physiography of S. China, and the full details of the river courses in the general map are most welcome for this type of study. The old block of S.E. China, the geological factors of the physiography of the Hu-peh basin, the details of Sze-chuan, are a few among the many points so well brought out in the geological map. We only wish that the general map had been provided with more indications of orography.

Comparative Wall Atlas of Commercial Development.

Edited by GEO. PHILIP. Set of 8 maps. 60/-. With explanatory handbook for teachers. Single map—dissected to fold—cloth—eyeletted, price 8/6.

This new series of coloured maps will deal with the commercial development of the six continents—six sheets, and have an additional sheet for the British Isles, while the eighth sheet (No. 1 on Philips' list) will show transport and occupations for the whole world. Each map is 42 x 34 inches, and allows of the use of a reasonable scale. The two maps received to date, viz., South America and Africa, certainly support the fairly extensive claims which the publishers make for the series. The scale in each case is 1 in 9 millions, and South America includes the West Indies, while Africa includes Europe as far north as Odessa and Central France. A variety of tints, 12 for S. America and 14 for Africa, contrast with one another, but not painfully so, and indicate not only the density of population in five ranges, viz., below 1, 1—8, 8—32, 32—256, and above 256 to the square mile, but also include general distributions of industries, with special reference to those dependent on vegetation. Bands of varying width indicate the volume of sea-borne commerce, while railways, navigable waterways, and caravan routes are clearly shown. The mineral symbols are few in number and easily learnt, and their distribution, apart from coal, is restricted to those places where the minerals are actually worked. The chief ports are printed in black, so as to be easily distinguished from the other place-names, which are grey coloured, and the chief imports and exports are arranged in order of importance in tablets conveniently placed near to the ports concerned. The total annual values are also given in millions sterling, but there is no indication on the map as to the year under analysis.

It is not intended that the maps should be used alone; constant comparisons are required with other maps showing climate, relief, etc., but they are certainly most valuable supplementary maps and will save the teacher and the pupils a great amount of time in necessary summarising. The ideal is for the pupil to build up a good map for himself—these represent very good maps built up by an admitted authority working carefully at the problem. South America and Africa are well synthesised, and teachers are strongly recommended to get the series, assuming that the other maps are equally good.

W.E.W.

Suggestions for the Use of Pictures in Teaching Geography.

Ethel W. Bishop.

ONE of the great advantages of the teaching of geography is that few aspects of the varied interests of humanity are not pressed into the service of illustration and explanation of basic geographic facts. This is particularly true of the use which can be made of pictures, rather than of photographs alone, excellent as these so often are. Much pleasure can be given by showing reproductions. The Medici Society, in particular, publishes excellent reproductions in colour of many of the famous pictures in the European galleries.

The British Rooms of our National Gallery give us many pictures of typical English scenery. East Anglia, is, of course, especially well represented in the work of Old Crome, Gainsborough, and Constable. " The Hay Wain " shows the quiet rural life, the shallow river, the beautiful trees, and the wonderful cloud effects, which are such a feature of East Anglian scenery. In " The Cornfield " we have a typical country lane, overshadowed by tall trees, leading to the field with its waving corn, beyond which we see the tower of Dedham Church in the distance. The flock of sheep and the small boy lying down to drink at the brook complete the picture of simple country life. " The Cottage in a Cornfield " gives us a picture of the beauty of a sunlit field, while " The Valley Farm " shows a study of trees and cattle with the figures necessary to give animation to the scene.

In contrast to these we have the pictures of the Stour, especially the well-known " Flatford Mill." From this we get a very good idea of the scenery of this part of England. It may be flat, but the trees are beautiful. The meadows are green, and the flowers and plants by the side of the small brook, painted with such loving care, delight us with their freshness and colour. Very different from the pictures of East Anglia are those of Hampstead Heath, not exactly the Heath as we can see it now, it is true, except in the wilder parts, but showing the great expanse of gorse-covered hills and hawthorn trees and free, wild country, generally seen under a cloudy sky. A study of Constable's skies is a lesson in cloud forms. Very interesting, too, are his pictures of Salisbury, particularly the beautiful " Salisbury Cathedral from the Meadows " and various river studies.

From Gainsborough's landscapes we get a vivid picture of typical Suffolk scenery. " Great Cornard Wood," " The Watering Place," and " The Market Cart " suggest themselves at once. Not only are they valuable for giving a picture of English scenery, but for showing us some thing of the occupations of the country people and suggesting comparisons with the life of our own day. The contrast between them and David Cox's beautiful studies of the West and Wales can be made to illustrate many points in the teaching of geography. To George Morland's pictures we go for other representations of rural life, of scenes outside country inns, of country pursuits. The best known probably is " The Inside of a Stable," with its delightful painting of animals. It is art related to the life of a region of stock farms, the Downs in contrast with East Anglia. The work of Old Crome has a fascination all its own. " Mousehold Heath " gives us the fresh, breezy inspiration of wide spaces, of a view unlimited by artificial conditions, a true picture of one of the many heaths and commons which are such a feature of parts of Norfolk. The classic landscape painters of England picture for us the setting of English life just before it was transformed by the application of machinery, and their special relation to Norfolk will not be missed by anyone who knows Havelock Ellis' "British Genius."

We do not go to Turner's pictures for accurate geographical knowledge, but more valuable than facts is the glowing beauty which he gives us. Some of his early works, "Calais Pier," "Crossing the Brook," for example, give fairly reliable representations, but the glory of the Venice pictures, especially "The Sun of Venice going to Sea," the wonder and fascination of "Norham Castle," the loveliness of his water-colour sketches, are a continual source of delight. The whole life and development of Holland can be illustrated from its pictures. Probably the best known is the famous Hobbema "The Avenue," showing the long straight roads, bordered by ditches, the tall poplars, the wide stretch of country with the characteristic church tower, the garden planted with standard roses which are receiving such careful attention.

The landscapes of Ruisdael give us the rushing river, the trees, the beauty of wild country or a view over a flat wooded country, a typical Dutch view with the inevitable church and windmill and a great expanse of wind-swept sky, while Cuyp shows us flat fields with peaceful cattle. We must not forget "The Mill" and the water colour sketches which Rembrandt left, but he shows us chiefly the people themselves, and any study of Holland and Dutch life must surely treat the story of the successful struggle of a fine people against adverse physical conditions. By studying his wonderful portraits we can appreciate the story of the development of the Dutch nation. There are also the seascapes, particularly those of Van de Velde, the many pictures of ships which emphasise the importance of Dutch trade. But the effect of women's work is shown, too, in the numerous pictures of interiors; those by Pieter de Hooch especially give us a real insight into the life of the people.

The same minute care and attention to detail we find in the still-life pictures, "The Poulterer's Shop" in particular. In the same way the work of Franz Hals, Metsu, Van Ostade, and many others can be used to stimulate interest in, and appreciation of, a great country.

Perhaps the most attractive of the Flemish pictures is the Van Eyck "Jan Arnolfini and his Wife," which is one of the very precious possessions of our National Gallery. The refinement and exquisite finish of the painting attract us at first sight, but the picture is a real human document. It is in French painting that we have the work of an artist who, a peasant himself, represents the life of French peasants of the Paris Basin and the West in a way which is startling in its vividness. In the pictures of Jean Francois Millet we see the real lfe of the fields, hard enough it is true, but dignified in its simplicity. The types painted are not beautiful in face and form, but we recognise the beauty of strength in action, of concentration in work, in pictures like "The Sower." In many a picture we notice the co-operation of man and woman in the work of the fields, a fact which is typical of the Paris Basin. "The Gleaners" shows us a familiar scene in the harvest field. It emphasises the hardness of the lot of many of the peasants, but surely there is nothing necessarily hopeless in the conditions under which they are working. "The Angelus" gives us the other side of the picture, and reminds us of the simple faith in which Millet, in common with his Norman ancestors, found an abiding solace. Delightful in their simplicity and truth to life are "The Meal" (La Becqnée) and "The First Step," pictures of incidents in a home-life which are attractive in their realism. But in the delicacy of its drawing and the power of its suggestiveness "The Fall of the Leaf" has an appeal of its own. Millet tells us of the peasantry which endureth all things.

The work of Corot and the other Barbizon painters is obviously of the greatest value in giving an impression of the country where they made their home. We are fortunate in having many Corots in this country, and the wonder of his trees, the soft shimmering of the atmosphere, his pure and delicate colour have an abiding charm. To those who know the Paris Basin, the rows of poplars besides the rivers and canals are a great feature, and so are the swampy pools of "wet Champagne." From the pictures of D'Aubigny we realise something of the majesty of the forest of Fontainebleau and the possibilities of life in those surroundings.

Another great painter whose work gives us an arresting picture of simple life is Jean Baptisle Chardin. We see ordinary people as they really were without any attempt made to idealise them. They are going about the ordinary business of everyday life. "La Pourvoyeuse" shows us a woman who has come back from market, and is putting down her huge family loaf on a dresser on which are objects of domestic use—for Chardin was essentially a painter of genre—or in "La Gouvernante" we see a small boy dressed in a quaint imitation of his father's costume just ready to set off for school. More arresting still is "La Fontaine" (The Woman drawing Water), with its faithful representation of homely life, and the perfectly delightful "Le Bênédicité" (Grace before Meat). A careful study of such pictures will surely awaken interest in the life of the French people and the conditions under which they live, and stimulate a desire to know more about them. The abundant evidence of Italian influences in French paintings can be used to exemplify the steady spread of factors of civilization from the classic lands through France to Europe in general.

The use to be made of comparatively modern pictures is obvious, but why should not the old masters, especially those of the Italian schools, be used to a certain extent in the same way? Pictures which date back to the time of the Florentine Renaissance can be shown to illustrate the story of mediæval Italy, of the magnificence of her great Republics, of the conditions which contributed to their growth. The story of Cimabue's "Madonna" carried in procession through the streets of Florence to S. Maria Novella can surely be an introduction to an interesting and valuable description of life in Florence, and there is no possibility of understanding modern Italy without reference to the history of her thought and to her greatness in the days of the simple faith expressed in the pictures.

In the same way the great frescoes of Giotto can be used to explain the position held by the Church in the Italy of those days, and its influence on the lives of the people as the heir of the greatness of ancient Rome and also as the custodian of the gospel. The frescoes of the life of the Virgin and the great statues of the Campanile are particularly valuable in this connection. So, too, the Fra Angelico frescoes at S. Marco suggest the story of his relations with the Medici family and their great part in the development of the Republic. In some of his frescoes we see the beginning of the representation of landscape, very simply in the Annunciation at S. Marco, rather more elaborately in the "Noli me tangere." But the wonderful "Ascent of the Blessed" in the great "Last Judgment" in the Accademia in Florence is surely the most beautiful of all the imaginations of a beautiful mind. Reproductions of all of these are quite easy to obtain, and children are nearly always interested in old pictures if a little help is given to explain the essential differences between the aims of early work and that of our own times. It is interesting to draw attention to the sharp outlines and brilliant colours so directly related to the clear bright sunshine of Tuscany.

As knowledge of perspective and of the art of painting developed, greater accuracy in representation is found, and the landscape backgrounds become delightful pictures, not necessarily of any particular places, but of typical Italian scenery. We see the slopes of the hills crowned with their small villages, the steep paths, the cypress trees, the myrtle groves, the rivers winding over the plain till in the far distance they reach the sea—and all painted with exquisite delicacy and charm. They help us to picture not only the contrasts in physical geography, but also those in vegetation, between Italy and our own country.

In Filippino Lippi's "Virgin adoring the Infant Christ" in the Uffizi we have a suggestve landscape background, and in the painting of the flowery meadow in the foreground Lippi gave full play to his love of nature, as he did in the large altarpiece, "The Virgin and Christ," in the National Gallery. Ghirlandaio's "Adoration of the Shepherds" has a delicately beautiful little landscape; in Perugino's "Virgin adoring the Infant Christ," in Bartolommeo's pictures, in many of Raphael's altarpieces, in many school pieces, as well as in numberless works of the great Italian masters, there are many other examples. "La Primavera" has much to teach of the beauty of Italian nature, of the meaning and glory of spring; "The Birth of Venus" shows us the delicate loveliness of form and colour which only Botticelli could paint.

Many of the pictures in the galleries of Venice are most suggestive, particularly Giorgione's "Tempest" with its wonderful stormy sky and its beautiful landscape, and, indeed, the more these great works of art are studied the more can be learned from them about the lives of the people among whom they were painted. Children are usually so ready to respond, so quick to appreciate beauty, so much interested in the lives of other people, that the judicious use of pictures makes teaching a joy, and is of real educative value in more than one direction.

The Biology of the Sea Shore. F. W. FLATTELY and C. L. WALTON, with an introduction by Prof. J. ARTHUR THOMSON. 336 pp, 23 x 14.5 cm, 16 plates, etc. Sidgwick and Jackson. 1922. 16/-.

Though the purpose of this useful work is not primarily geographical, it may be warmly commended to any teachers of the subject who are working near the shore and wish to study their own locality. The authors discuss the biological zoning of the shore and the adaptations of the creatures that live in each, and the fact that Professor J. Arthur Thomson gives a commendatory introduction is in itself a valued passport to many a teacher's goodwill. Twenty pages are given to the economic aspects of shore life. The photographs are very good, and some specially clear ones are the work of M. Culliford (Aberystwyth). The authors treat interestingly of the physiography of the sea shore, the varying salinity of the water in relation to rainfall and other factors, the relation of tides to vegetation and animal life on the shore (a section which might well be enlarged), the circulation of British waters, wave action in shore life. This chapter is closely related to that on the special problems of shore life, such as the rhythm imposed by the tides, the protective arrangements in view of variations of salinity, and so on. A good table gives a "food chain" among shore animals and plants, and throughout the book are thoughts which must attract the geographer with biological interests.

Geography of the Bible. E. K. HOWARTH. 96 pp, 18.5 x 12.5 cm; end pieces and several photo illustrations. Oxford Press. 1922.

The Bible is so valuable to geography teachers that any study of its geographical setting is welcome, and we hope this book will be widely used and will encourage the production of others, as well as the study of the famous treatises on those regions, like G. A. Smith, "Historical Geography of the Holy Land"; Robertson Smith, "Religion of the Semites"; Doughty's "Arabia," and many others of hardly less value, including Sir W. M. Ramsay's "Education of Christ," so full of the author's geographical insight. The authoress has brought into her little book some fairly recent additions to knowledge, and the paragraphs are often interestingly written. We hope the Oxford Press will follow up this by a Bible edited to a minimum extent for children, but giving actual photographic illustrations showing what is "the eye of a needle," what it means to "roll away the stone," and so on; we are sure that a Bible of this kind would not only refresh a class-subject which urgently needs renewal, but would also spread far and wide a better appreciation of the geographical point of view. Some teachers may find it useful to know that Sir G. A. Smith has issued (1918) a short summary of his great book. The summary is "Syria and the Holy Land" (Hodder and Stoughton; one shilling).

U.S.A. Coast & Geodetic Survey Publications, II.

WALLACE E. WHITEHOUSE.

THE total number of U.S. C. and G.S. publications included in the last annual list (obtainable free from Government Printing Office, Washington) is upwards of 300, and the volumes vary in character from those intended for the general reader to works which are so technical in form that their appeal is restricted to the specialist, but all of them give evidence of careful workmanship.

In the last number of the " Geographical Teacher " (page 261) some reference was made to certain selected volumes which might be conveniently grouped under the general heading of " Cartography and Map Projections "; these notes will deal with a few of the other books and more particularly those which treat of surveying, including geodetic work.

MISCELLANEOUS. Several of these publications need only to be known to be appreciated by a wide circle. Serial No. 135, Special No. 23, 2nd edition, 1920 (102 pp., 9in. x 6in., original price 10 cents), is strongly recommended. It contains a very good description of the work, methods, and organization of the survey. Among others it deals with the following topics :—Triangulation, base lines, precise traverse, astronomic work (a difficult subject carefully explained), terrestrial magnetism, topography, hydrography, tides and currents, leveling, nautical charts (including mass reproduction), oceanography, gravity, geodesy—all items carefully summarised by experts. With its 32 plates, many of them full page, and its three maps, it makes an ideal text-book of actual surveying processes, and would serve as an admirable correction of some of the ideas which are occasionally gained by pupils consequent on the rough-and-ready work usually classed as " surveying in schools." Without re-opening the vexed question as to the value of geometrical surveying in the geographical scheme, perhaps one may be allowed to suggest that pupils and students are not likely to appreciate the beautifully refined work which distinguishes modern surveying if their efforts are restricted to the use of a more-or-less-accurate chain and a " model " theodolite, clinometer, etc., and their ultimate aim is only an " approximate " map. The actual instruments used are too complicated and too expensive to be put into the hands of amateurs, no matter how well meaning they may be, but pupils doing any survey work at all should be informed of the existence of these accurate appliances, and in this connection the illustrations in this little booklet will be invaluable. At the end of each chapter is a reference to additional and more elaborate publications which will allow the reader interested in the topic to indulge in deeper and more extensive study ; some of these larger works will be found mentioned later under their respective headings.

Rather different in form is Serial No. 142, Special No. 26, 2nd edition, 1921 (pp. 216, 7¾in. x 5in), " General Instructions for the Field Work of the U.S. C. and G.S." This deals with approximately the same items as No. 23, but is considerably more detailed and has a wealth of tables and hints for field surveyors. In all 601 hints, obviously compiled by practical men, are given, and the technical side of the subject is fully covered, but no price for the book is given, nor can it be traced, and it is not clear whether it is for issue to the general public or not—if it is so issued its price is likely to be about 20 to 30 cents.

Serial No. 47, Special No. 38, 1916 (pp. 15, 9in. x 6in., 40 cents), entitled " Elements of Chart Making," and written by the Superintendent—E. Lester Jones—is another general publication. It is less detailed in some items than No. 23, but has a special value of its own in its illustrations, which show in a novel manner the method of building up an actual chart (included in the publication), stage by stage, from the initial astronomical determinations up to the finished map. There are photographs of field parties engaged in each of the operations concerned, and the whole thing is very well arranged. One would like to see a set of lantern slides prepared on just this system and some form of loan circulation of them for schools ; more ambitious but not impractical would be slides and films, but this must belong to the future.

Serial No. 81, Special No. 48, 1918 (pp. 21, 10½in. x 8in., 10 cents), " The Neglected Waters of the Pacific Coast," and Serial No. 87, Special No. 50, 1918 (pp. 41, 10½in. x 8in., 30 cents), " Safeguard the Gateways of Alaska," are two popularly written books by the Superintendent, and form excellent propaganda material demonstrating the scientific and commercial value of accurate hydrographical surveys. They have excellent illustrations and maps, those of the latter, some 50 in number, being of great value, and it forms a most useful geography text-book relating to modern Alaskan conditions.

The number of books in the other groups is so large that it is a difficult matter to choose, but the following are broadly representative of their several classes.

TERRESTRIAL MAGNETISM. Messrs L. A. Bauer, R. L. Faris, and Daniel L. Hazard have been responsible for numerous reports and analyses of magnetic observations made by officials of the Survey ; perhaps Serial No. 126, Special No. 33, 2nd edition, 1920 (pp. 16, 9in. x 5¾in., 5 cents), can be taken as typical of the smaller books. It shows the distribution of magnetic declination in the United States for January 1st, 1915, with a well-executed isogonic chart (29in. x 23in.—extending well into Canada and Mexico) and secular change tables. Irregularity in the changes as determined for 1910 became apparent later, and these new figures refer approximately to the average for the period 1913—1919. As soon as the data have been worked up the tables will be extended to 1920, and a new isoganic chart—for 1920—will be issued. Terrestrial magnetism is usually not now discussed in any detail in the geography course, and rightly so, but as the declination of the compass is usually referred to in connection with surveying, the existence of these official booklets may be appreciated.

SURVEYING. Appendix No. 7—Report for 1905—reprint, with corrections, 1916, " A Plane Table Manual," by D. B. Wainwright (pp. 52 and plates, 11½in. x 9in., 50 cents), not only well illustrates and explains the plane table, but also sets out very fully the whole practice of high class plane tabling ; there are also numerous hints on contouring. Several pages are devoted to various conventional symbols, and there are numerous large specimens of topographic sheets containing selected symbols. Several tables of calculations, a scale of slopes, a scale for shading, and a graph (which frees contouring from the necessity of making computations) render the whole production a first-rate reference book.

HYPSOMETRY. The Geodetic Levelling of Great Britain recently completed by the Ordnance Survey was dealt with on page 62 (118) of the Summer 1921 " Geographical Teacher." Comparison might be made with the U.S.A. procedure for and results of " precise levelling " as set out in Special No. 18, 1914 (330 pp., 11½in. x 9in., 40 cents), by William Bowie and H. G. Avers, and in Special No. 22, 1914 (67 pp., 11½in. x 9in., 15 cents), by William Bowie. The former publication explains in full detail the field and office work for the adjustment of the precise level net in the United States, and is a complete manual on the topic ; the later gives the interesting results of John H. Peter's work in 1911 and 1912 when he ran out a line of precise levels from Brigham (Utah) to San Francisco—not less than 891 miles in all.

GEODESY. Numerous publications deal with longitude determinations and triangular results, and the official list should be consulted. Two others call for special mention, viz. : Serial No. 50, Special No. 40, 1917 (pp. 196, 11½in. x 9in., 60 cents), "Investigations of Gravity and Isostasy," by William Bowie, and Serial No. 150, Special No. 69, 1921 (pp. 96, 9in. x 6in., 15 cents), "Modern Methods for Measuring the Intensity of Gravity," by Clarence H. Swich. Neither book is easy to summarise. The form of gravity apparatus as developed since 1873 by the U.S. C. and G.S. during their active interest in the subject, ranks as one of the best in the world, and has been adopted in many countries. It is here described, observations are analysed, and the whole question of gravity and isostasy is made as simple as the topic permits ; both books contain interesting historical details of the development of the various theories on the subject since the time when Richer in 1671 first demonstrated different gravity intensities at different places, and the larger volume also includes a heavy bibliography commencing 1855.

Ordnance Survey and Map Issues V.

IN the Summer 1921 Number of the "Geographical Teacher," page 61 (117), reference was made to certain promised new issues by the Ordnance Survey. Some of these have since been received.

ONE INCH TOURIST MAPS.

DARTMOOR, 22 miles by 28 miles, centred on Princetown with Okehampton, Plymouth, Moreton Hampstead, and Gunnislake shown complete, is a very beautiful, clearly printed map, layer tinted (no scale of tints shown on map, but bright green extends to 300′, dull green to 600′, and then the highlands are shown in orange browns with slight but perceptible deepening of tints for each extra 300′), with contours at every 50′ throughout, water in solid blue, and roads and other artificial material as on the Popular Edition series of maps. There is no cross or vertical light shading and no hachures apart from a few microscopic cliff edge and crag side examples. Price 3s., linen backed.

EXMOOR—34 miles by 22 miles, centred on 3° 5′ west longitude and 51° 5′ N. lat., with Foreland Point, Ilfracombe, Old Cleeve, and Rackenford shown complete. Price and map details as for Dartmoor Sheet.

LONDON—a very large sheet, 36 miles by 26 miles, centred approximately on Acton, with Chipping Barnet, Woking, Taplow, and Woolwich shown complete ; layer-tinted with bright green to 50 ft., duller green to 100′, and then orange browns very faint at 100′, but deepening in tint at each 100′ to 600′, when a rich, warm shade is reached. The relief effect is much better than in either of the above maps, which in comparison are rather washy. The map is also hachured, which still further assists in the picturing of the relief, and even in a highly congested and developed region such as this there is no obscuring of other detail. Price and other items are as in the Dartmoor map. The sheet deserves a wide sale in schools even out of the London area, for many exercises of great importance immediately suggest themselves, and the map seems ideal for questions of ancient and modern lines of communication, for example. The Ordnance Survey authorities have made the important concession that this or other small scale maps, if ordered direct from Southampton for educational purposes in quantities of 20 upwards, will be supplied at two-thirds of the ordinary selling price. So far, the concession appears to be limited to twenty copies of the same map (communication M.B. 1221/22), but if twenty institutions combined it should be possible to overcome this difficulty. Twenty different selected one inch coloured mounted maps for £2 (plus postage from a centre) should be within the reach of many schools even with the existing "economy" campaign.

NEW PHYSICAL MAP OF ENGLAND AND WALES. Inner border of map 21½in. x 29in., Glasgow and Edinburgh, part of east coast of Ireland, Calais and Jersey are included. The scale is 1 in one million. The map is a clean, open production, and will be of great value in mapping distributions. It is layer tinted, browns commence at 200 feet, and the contour and layer intervals are the same, viz. : 0, 200, 400, 800, 1200, 2000. A fairly good relief effect is produced, though one has a tendency to read too much highland into the map ; in this connection the omission of the conventional 600 contour will be regretted by some workers. Water and water names are in blue ; all other names are in black, and a variety of type has been employed, which facilitates rapid reference. The majority of the ranges and ridges are named; there are also numerous separate peak heights without any attached names, the reason for which, in many cases, is somewhat obscure. Many named town sites are included, in order that positions can be more easily determined, but the selection of these is puzzling, particularly as all town symbols, e.g., London and Windsor, are made the same size. Cardigan Bay is fortunate in having eight towns on its coast line, but South Wales has nothing between Pembroke and Cardiff along the coast, and the only coast town between Liverpool and Kirkcudbright is Lancaster. The omission of Blackpool, Rhyl, Llandudno, Ilfracombe, Bournemouth, etc., offers a contrast to the inclusion of so many east and south-east pleasure resorts. Why Ellesmere and not Oswestry, and why Northwich and not Crewe, and so on? Still these are less important points, for the map is a very good one. It is to be sold at 2s. per sheet (paper), but if 20 or more are ordered direct from Southampton for educational purposes, the price will be reduced to 1s. per copy ; that also makes it a cheap map.

NOTE ON INCREASED PRICES OF LARGE SCALE MAPS. Each 1 : 2500 sheet increased from 5/- to 6/8. Each 1 : 1250 enlargement from 6/- to 7/-. Each 6 inch full sheet from 4/- to 5/-. [6 inch quarter sheets still remain at 1/6 each.]

W.E.W.

La Cathedrale de Chartres. Seven volumes with 90 plates in each and short explanatory text ; 30 x 26 cm. Price, bound 494 francs, unbound 390 francs. One of the above volumes deals with the general architecture, and may be bought separate for 72 francs bound or 57 francs unbound. There is also a monograph of the cathedral with 24 pages of text and 64 selected plates of the same size as the above, price 57 francs bound.

This remarkable series is the labour of love of M. Etienne Houvet, the famous gardien of the cathedral, who has made his name known and highly respected wherever there are students of the Middle Ages in Europe. During the war, when the glass was removed for safety, M. Houvet did his utmost to secure complete photographic records of this queen of the cathedrals, which fortunately escaped damage. His devotion and his enterprise in bringing out this fine series of photographic studies deserves all possible support, and we hope that several readers will try to get either the whole work or a part bought for libraries and so on in their various cities and towns. Purchasers should write direct to M. Houvet, 20, Rue de Rechévres, Chartres, and should pay by British cheque with the amount stated in francs. The Cathedral of Our Lady at Chartres is the earliest of the great series that can be traced on through Reims and Paris, Coutances, Bourges, Amiens, and Beauvais, and it is in many respects the oldest of them all, while its history and its probable continuation of a prehistoric consecration add to its interest in many ways. Its glass is the finest collection extant, and the authorities hope to have it completely reinstalled early in 1924, when the cathedral will certainly be ablaze with brilliant colours; the 12th century glass and stonework are especially fine. Chartres is one of the most typical of the old market towns of the Paris Basin, and is in a sense the link between Beauce and Normandy. The town, as well as the cathedral, is well worthy of a visit from every teacher of the geography of France, and we hope that many readers will plan to go on pilgrimage to it in 1924.

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Some Problems of the Climate of Palestine.

LILY WINCHESTER.

Extract from an Address given at the Annual Meetings of the Geographical Association.

THE country of Palestine is of great interest to us, partly because it is associated with our earliest and deepest feelings, and partly because of its innate fascination, its mystery, and the interest is heightened by its emergence into the field of western economics. Can this country, where for centuries the soil has been neglected and the rain run to waste, become a modern nation state? Will its climate, dry and unfavourable, permit of this? Obviously aridity is a great barrier to economic independence.

Palestine lies on the margins of important pressure areas and forms part of the "Land of the Five Seas," and these seas exert a great influence on the climate. To the east lies the Asiatic high pressure with its European prolongation westwards, to the south the Azores high pressure band extends eastwards to the valley of the Nile. The Persian Gulf slightly modifies the Arabian extension of the Asiatic high pressure, the Black Sea influence on the European high pressure is marked, while the Red Sea defines the abrupt termination of the Azores and the Asiatic high pressure areas.

Within high pressure areas there frequently exist systems of further concentration, anti-cyclones within anti-cyclones, maintaining an independent clockwise circulation of air within the parent anti-cyclone. Two such areas are important for our discussion—(a) Balkan anticyclone, (b) Insalah anticyclone (North Africa).

To the west of Palestine lies the Mediterranean, a cauldron in which many varied influences operate.

1. From the Balkan and Insalah high pressures, air moves outwards with a clockwise motion, and this tends to maintain and emphasise the high pressure occurring on the right of the outward moving air, but helps also to produce the area of relatively lower pressure over the Western Mediterranean. This area of lower pressure forms a possible entrance for Atlantic storms.

2. The waters of the Mediterranean are almost tideless and lie like a pool of warm water, heating the air immediately above.

3. The lands round the Western Mediterranean are mountainous, cut by long river valleys running down to the sea, such as the Rhone and the Ebro, while round the Eastern Mediterranean lie mountain and high plateaux to north and east, and low-lying lands converging on desert, to the south.

Topographical variations tend to produce variations in the temperature of air currents moving over them, cold currents from the north and warm from the south, flow towards the sea and overlie the warm layer of air resting on the water. Such variations tend to produce instability, and instability demands readjustment, a frequent cause of storms.

During winter the cyclone of the North Atlantic Ocean moves southward, and depressions from this cyclone moving eastward over the Mediterranean find there a congenial environment owing to the instability of its atmosphere.

It has also been suggested that the passage of depressions north-eastward over the Atlantic may help to produce depressions with the Mediterranean.

The Mediterranean as a result of many causes is a cyclonic area.

This passage of depressions is important. Prof. Bjerknes says "a cyclone is a system of low barometric pressure in which there are two lines of convergence of equatorial and polar air streams." In the front of the depression the equatorial air meeting the cold, mounts on top of it ; in the rear of the cyclone, the polar air forces itself under the equatorial air ; in both parts the warm air is lifted into colder regions. If this warm air becomes sufficiently cool, rain falls from the uprising air through the lower layer of cold air on to the earth. Hence rain storms are frequent in the Mediterranean during winter.

Depressions move eastward along the Mediterranean, and many reach the Syrian coast and pass over Palestine. Depressions rarely, if ever, move down the Red Sea from the Mediterranean. Such a path would be an unusual one for a cyclone, and probably a slender ridge of high pressure near the northern end of the Gulf of Suez bars the way. It would be a disaster to Palestine if depressions did move down the Red Sea, as her rainfall would suffer.

It is to these cyclonic depressions, originating probably in the Atlantic and travelling over the Mediterranean, that Palestine owes her comparatively heavy winter rainfall. On the coast, Gaza 16.5 inches, Jaffa 23.6, Haifa 27.0, Beirut 35.7 ; inland stations, Hebron 24.2, Jerusalem 26.0, Nazareth 27.1. All this rain comes within seven months. The rainfall increases as we journey northward in Palestine—a problem requiring further elucidation.

The rainstorms are often accompanied by thunderstorms, and cloud bursts are frequent. In Jerusalem as much as 4.6 inches has fallen in twenty-four hours.

One characteristic of Palestinian rainfall is its uncertainty. The cause is not far to seek. What is as uncertain as the coming of a cyclone? Slight oscillations of any high pressure areas in the vicinity would prevent its passage, slight shrinkage would give it way.

In normal years the rainfall is sufficient, and the problem is one of storage. As our troops marched north along the Shefalah and Sharon plains, water was obtained from wells sunk into the underlying quicksands. The Royal Engineers, who provided water for the soldiers as well as for the civilians of Jerusalem, discovered some ancient and disused irrigation channels, probably of pre-Christian or early Christian age.

Summer is a period of drought, though as Miss Nicholls emphasises, dew and mist are frequent. During these months the Eastern Mediterranean as far west as 30° is under monsoonal pressure, which centres in Baluchistan and the Persian Gulf, and this vital change in pressure conditions creates the summer climate. Palestine then becomes Asiatic. Land and sea breezes visit the coast, but practically no rain falls. Small convectional currents exist, as are seen in the whirl-winds or dust devils, and frequent water spouts, but thunderstorms with their accompanying storms of rain are almost unknown. The explanation for this aridity will probably be found in the conditions of the upper air.

Little therefore can be expected during summer to relieve the problem of aridity ; the future of Palestine depends on the possibility of storage of winter rains. If adequate storage is practicable, it may be that Palestine will again become " a land flowing with milk and honey."

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Climate Notes.

THE POLAR FRONT.

J. FAIRGRIEVE.

ONE of the difficulties in understanding climatic conditions arises from the fact that the atmosphere is a moving machine, and such a dynamic system has different properties entirely from a static one. One movement is continually leading on to another, and it is of little use trying to explain the beginnings of things ; there are no beginnings, only modifications. If there ever was a beginning, it was so inconceivably remote that conditions were entirely different from what they are now, and there is little use in considering them. Investigation of meteorological and climatic phenomena is more and more taking the form of enquiry into the factors which are acting to modify the thing that now is, so as to produce the thing that will be.

The emphasis on dynamics has profoundly changed the point of view. During the last twenty years, thanks largely to the influence of Sir Napier Shaw, lately retired from the Directorship of the Meteorological Office, the effect of forces has been calculated exactly and investigation put on a much surer scientific basis. This has had the unfortunate effect of rather shutting out the ordinary person who has little acquaintance with the methods of what he thinks is higher mathematics ; but it has had the very satisfactory result of emphasising the fact that it is only when changes take place that forces act. It has, for example, cleared out of the way the fallacy that hot air rises in virtue of some inherent quality in the hot air, and laid the emphasis on the action of gravity on the cold and heavy air as being of fundamental importance. As a result of the changed point of view, the polar regions are coming to assume very considerable importance in the scheme of world climate, not only in the present, but in the past. In the past, for some reason but imperfectly understood, glacial masses waxed and waned over large areas of the earth's surface, and in their growth and decay set up circulations which modified fundamentally the climate of the rest of the world. Air flowing off the surface of such great ice-covered heights might in fact be looked on as the fundamental driving force in the atmosphere. The results are bound to be complex. Owing to the rotation of the earth, such surface winds are compelled to take the form of an anti-cyclonic circulation. To supply the surface wastage, air in upper levels must flow towards such an icecap, and in doing so take the form of a cyclonic circulation. Both circulations are modified by local differences of temperature, which in turn induce differences of pressure, and these again tend to further modifications of detail.

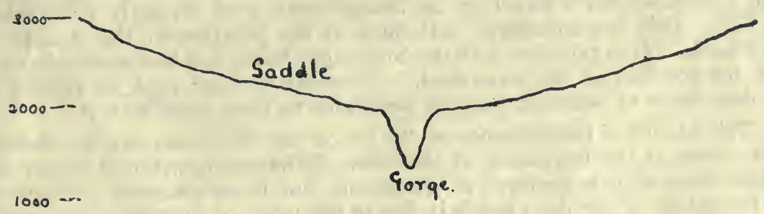
At the present day the existence in the Antarctic of a Polar icecap from which, in places, winds rush down with continuous hurricane force averaging 50 miles an hour, exemplifies how things work. This outflow seems to be related to many climatic phenomena all over the world, and it is probably not an accident that in the southern hemisphere atmospheric phenomena take place with greater vigour than in the northern, where there is no such polar cap, and only in Greenland, placed excentrically, is there any such cap at all. But though the excentric position of the Greenland icecap may be supposed to induce a more complicated circulation than a polar cap would do, we may be sure that it has considerable effect, and it is not unlikely that there is a motion outward from the Arctic as a whole, less violent than in the Antarctic, yet having fundamental effects on circulation. Prof. Bjerknes has indeed been doing a good deal lately to convince folk that it is along the polar front —or the line along which polar air meets air that has not come recently from the poles—that cyclones form and travel.

A few Problems connected with the Development of the Brenner Pass and Saddle.

M. E. Lancashire,
Southend High School for Girls.

THE Brenner Pass affords an easy route across the Alps in the region where they are widest. The Etsch valley forms a long gulf into the mountains as far north as Bozen. There the valley divides to meet again in the Sterzinger Basin. The valley, which is now called the Wipptal, passes north, dividing the Oetztal and the Zillertal Mts, and joins the Inn valley. So at Innsbruck one of the longest transverse valleys of the Alps meets a longitudinal valley. It is thought that in Eocene times the Brenner lay between two bays in the Eocene Sea.

The Brenner 1,360 m. appears to a traveller by road or rail to be a narrow notch in the mountains, the 2,000 m. contour lines being only 2 km. apart at this point. But on climbing to the height of 2,000 m. one finds oneself in a wide valley with the peaks of the Oetztal and Zillertal rising on either side. The 2,500 m. contour lines are 9 km., and the 3,000 m. contour lines are 18 km. distant. So that the Brenner is not only an incision in the mountains, but a broad saddle, in which the pass itself has been cut. This is proved by the fact that in the neighbourhood of the pass one can cross the watershed in four different places without rising to the height of 2,500 m.

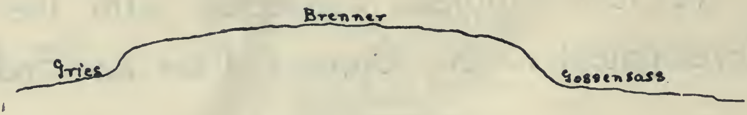


I Rough Section across the Brenner from W to E

Diagram 1.

Opinions differ as to the classification of the Brenner. The pass itself is in a gorge, but it differs from the water-gap which the Brahmaputra has formed through the Himalayas, in that the floor of the gorge slopes gently in both directions, so it cannot be called a water-gap. In differs from the cols of the Pyrenees in that the valley is continuous. There is no ridge of rock separating the two valleys. The actual watershed in the gorge is a marsh, and a very small obstacle would cause the Sill to flow to the Eisack, or vice versa. The formation of a scree or an alluvial cone could effect this.

Solch was of the opinion that the saddle is only a part of an old valley floor, because at Gries and Gossensass there is a break in the continuity of the valley bottom. The valley between Gries and Gossensass ‘ hangs ’ above the valleys to the north and south of it. This is specially pronounced at Gossensass, for the railway has to make a long detour into the Pflerschtal in order to reach the lower level at Gossensass. Therefore one might regard the Brenner as an irregular example of the valley-pass type.



II Rough Section of Wipptal valley floor.

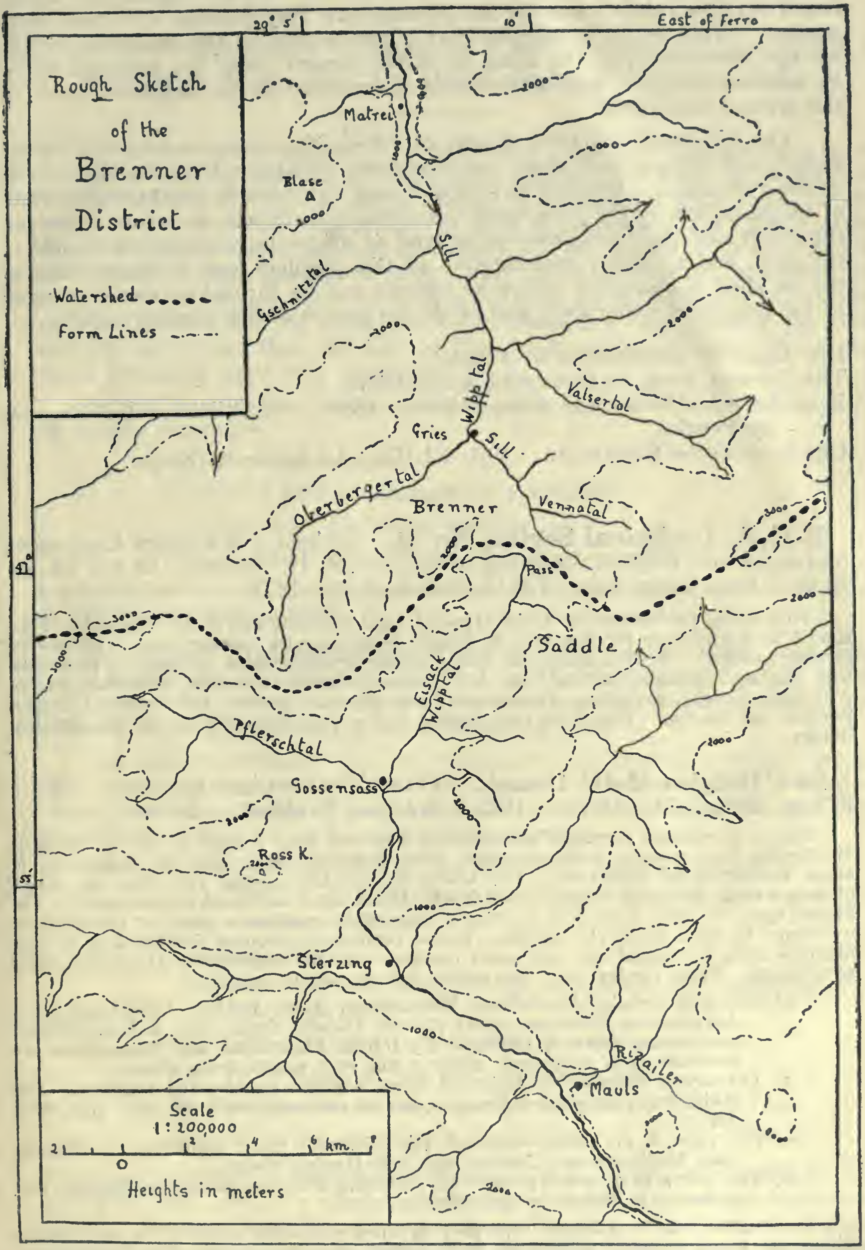
Diagram 2.

The history of the development of the Brenner Pass seems to contain many difficulties. The low altitude of the pass may be due to the nature of the rock. According to Solch, the rock in the neighbourhood consists of less resistant schists inserted between the old masses of the Oetztal and Zillertal Alps. It is well-known that the Vordere Silltal follows a fracture, on the eastern side of which there has been positive movement, so it is possible that fracturing may have had something to do with the development of the Brenner. It is the formation of the broad saddle above the pass which is more difficult to explain.

It seems probable that the watershed has always remained in the neighbourhood of the pass, although it may have shifted its position many times. From a casual glance at the map, it appears likely that the watershed was once to the south of Mauls, as several tributaries of the Eisack flow into it from a south-easterly direction, as though they were formerly tributaries of the Sill. This is particularly noticeable at the junction of the Rizailer and the Eisack. It is possible that the Sterzinger basin has had something to do with the position of the watershed. It seems to have sunk so rapidly that the deposition of alluvium has not been able to keep pace with it.

The nature of the influence of the ice on the formation had not definitely been stated at the beginning of the war. The neighbourhood shows many of the characteristic features of glaciation, but it seems more probable that the formation of the deep notch is due to the work of running water, than to that of ice. There is a small lake near the pass, which might be due to glacial erosion, and at the mouth of the Vennatal lies glacial material.

Opinions differ as to the formation of the hanging valleys at Gossensass and Gries. It seems that hanging valleys may be produced (according to some authorities) by the confluence, diffluence, or transfluence of glaciers. If the ice shed was to the north of the pass and a glacier flowed to the south over the Brenner, it is probable that it would have been about the same size as the Pflerschtal glacier. The meeting of these two glaciers would cause a confluence step to be formed. Then the hanging valley to the north would be due to internal diffluence, and the Oberbergertal glacier would flow partly inward. It does not seem likely that the preglacial watershed lay to the north of the pass, as that side is very highly glaciated. According to Solch, the position of the glacial material will not allow of a transfluence taking place to the north. He thinks that the ice-shed lay somewhere between the Brenner Lake and Gries. Perhaps the Pflerschtal glacier moved to the south and the Oberbergertal glacier to the north, whilst the Vennatal glacier spread out over the saddle and divided, one half flowing to the north and the other to the south. These glaciers would be smaller than the Pflerschtal and Obergertal glaciers. (At Gossensass there are terraces similar to the parallel roads of Glenroy). Then both hanging valleys would be due to confluence, and the glacial formation of the saddle would be the work of the Vennatal glacier.



According to Penck, in his Alpen im Eiszeitalter, the surface of the ice during the ice age appears to be at about 2,300 m. on the Blase, about 2,000 m. in the neighbourhood of the Sterzinger basin, and the same at Bozen, which is much farther south, and 2,200 m. on the Ross K, so that if the ice-shed was in the neighbourhood of the pass, the surface there should have been at about 2,400 m. At the time the book was written this had not been verified. A special study was made of the climate of the Wipptal, and it was found that the rainfall and the temperature are very uniform over the whole region. This seems to suggest that if the heights of the mountains in the ice age were relatively the same as at the present time, the snowfall would be uniform, and the iceshed would be somewhere in the neighbourhood of the present watershed.

Von Kerner found three blocks of schiefrigen Gneisses on the Brenner saddle, and there is some doubt as to whether they came from the Gschnitztal or the Pflerschtal. Erratics have been found at a greater height to the south of the pass than on the pass itself. According to Penck, no erratic found on the north side has been definitely proved as originating on the south side of the pass, and a further investigation of this problem and of the position of the ice shed is necessary before an opinion can be formed as to the position of the preglacial watershed, and of the formation of the Brenner saddle.

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Zeitschrift des Deutschen Alpenvereins. 1887. An article on the Brenner by Penck.
Oesterreichische Rundschau. Vol. XLIII. An article by Sieger.

R.G.S. Technical Series, No. 2. Alphabets of Foreign Languages translated into English according to the R.G.S. II. System. 24.5 x 16 cm. 72 pp. Roy. Geog. Soc. 7/6 (to Fellows 6/-). 1921.

This useful publication by Major-General Lord Gleichen and J. H. Reynolds, M.A., should be of great use for reference by geographers who wish to learn how to pronounce foreign names. There are several tables giving transliteration of foreign alphabets. The language groups covered are the Teutonic, Keltic, Romance, Slavonic, Baltic, Albanian, Greek, Armenian, Caucasian, Finno-Ugrian, Arabic and related groups. Semitic and Basque. This little book should find a place in every serious geographical library.

Su l'Origine dell' Uomo. PROF. V. GIUFFRIDA-RUGGERI. xiv. + 272 pp, 24 figs, 24 x 16 cm. 1921. Bologna, Zanichelli. 24 lire.

This is a welcome survey of the races of man and their origins by one of the most distinguished of modern anthropologists, with abundant references to researches of other workers in all countries. The author accepts the current view that the cradle of man was in Asia, but suggests that North Africa may also need consideration. The higher apes, for him, were just as clearly adapted to conditions south of Himalaya as were men to more northerly regions. There, conditions favoured development of carnivorous diet, terrestrial life, and erect posture, with the appropriate facial and nasal adaptations. From Central Asia the author traces various spreads.

(a) The first includes Australians, Melanesians, Ainu, Veddah, Dravidians, some Aurignacean European types (Combe Capelle skull, etc.), and an element penetrating down E. Africa. He thinks Australians and Tasmanians are descendants of a common ancestor not very remote from either.
(b) The second includes the Grimaldi types, negroes, pigmies and bushmen. The Malaysian pigmies and Papuans are an eastward wave of this type from Africa.
(c) The third is the north-westward fair skinned wave, including Cro-Magnon man, Mediterranean, Nordic, and Indo-Iranian stocks.
(d) The fourth is the eastward spread, including Mongols, Amerinds, Eskimo, and elements in Indonesia and Polynesia.

The scheme may be criticised especially by those who think some of the early skulls which he would refer to a, b, c are very closely akin, while some, like Cro-Magnon, which he also puts under c, are very distinct. But it is a great point to have both ancient and modern types considered together; correlations with climatic history are unfortunately lacking. It is with great regret that we record the death of the distinguished author after the end of the year; he was one of the most widely read and most sanely critical of all scientific students of mankind.

The Place of Geology in Practical Life.

A note on an Experiment in Secondary School Work kindly communicated by MISS E. E. FEATHER, The High School for Girls, Macclesfield.

THIS subject was suggested by the Chester Society of Science as a competitive essay open to all children in secondary schools in Cheshire. We decided to attempt it in Form Middle V., where the girls were 14—15 years of age. Two teaching periods of forty minutes each and a preparation period of thirty minutes could be given to it for ten weeks. In this limited time it did not seem possible to give a very full treatment to the subject, so we obtained permission to try to work it out with special reference to our own county of Cheshire. The work proved so interesting that some of the girls willingly gave more than the allotted time to it, and as a form effort the essays produced were very creditable.

As well as a written essay, each girl made a set of superposed maps of the county showing—

(1) Physical features.
(2) Solid geology (somewhat simplified).
(3) Drainage (including canals).
(4) Communication by rail and main roads.

A contour section and a geological section across the county were also made, as well as various diagrams.

A collection of photographs and picture post cards which illustrated points in the essays was made, classified and pinned up on the classroom wall as the work proceeded, and the girls contributed to this as well as to the collection of rock specimens which was also on view.

The greatest difficulty was to arrange for the necessary outdoor work, and, though in theory the whole class should have done it all, we had to content ourselves chiefly with the results of individual observation, and only one or two Saturday expeditions could be managed.

The girls were asked to bring to class notes on such points as—

(1) Building materials used in different parts of the county for houses, walls, etc.
(2) Road metal.
(3) Nature of soil as shown by vegetation, e.g., oaks on clay, pines on sand.
(4) Crops, related to soil when possible.
(5) Proportions of pasture and arable land.
(6) Details of water supply, especially on outlying farms.
(7) Industries in towns and villages.

We found people very patient and courteous in answering our questions and giving us help, and were specially indebted to the Curator of the Northwich Museum for details of the salt industry. We also found much valuable information in books such as Coward's " Cheshire," Woodward's " Geology of Soils and Substrata," Duly's " Natural Wealth of Britain," Avebury's " Scenery of England," Hardy's " The Geography of Plants," and especially in an article by E. J. Russell in the GEOGRAPHICAL TEACHER and his most helpful book, " The Fertility of the Soil."

A brief plan of the essay may be of interest to anyone who wishes to attempt similar work, which more than repays any time and trouble spent upon it.

The four main divisions were the influence of geology on—

1. Shelter.
2. Food.
3. Clothing.
4. Communication.

1. SHELTER is affected in three ways—A. Materials ; B. Fuel ; C. Sites.

A. MATERIALS should be durable, weather-proof, and obtained as near as possible to the building site to save cost of transport. Advantages and disadvantages of granite, sandstone, limestones, and freestone, bricks and timber for the purpose. Roofing materials should be impervious, but light. Advantages and disadvantages of heather, straw, shale and slate.

B. FUEL. Localities using wood, peat, coal, and gas, and their advantages and disadvantages.

C. SITES should be chosen with a view to good foundations, water supply and communications. Advantages and disadvantages of granite, sandstone, limestones, clay and sand as foundations and sources of water supply. Methods of obtaining water by springs and wells and ensuring its purity.

THESE CONSIDERATIONS APPLIED TO CHESHIRE.

A. MATERIALS. Millstone grit with shale for roofing near the Pennines. Red sandstone with thatch or tiles typical of the red sandstone outcrops. "Daub and wattle" of the fluvio-glacial deposits of the plain. More modern use of bricks from clay, and imported slate.

B. FUEL. Timber from forests. Peat from old "ice age" lakes. Coal from carboniferous limestone.

C. SITES. Generally on outcrops of harder rock rather than sand or clay. Danger zone of salt and coal mining areas. Water supply from grits by reservoirs or springs ; by wells from sandstone.

2. FOOD.

Sandy soils—poor in plant food and too pervious, therefore produce heath and poor pasture. When improved by addition of clay, lime, and manure, make good market garden and fruit soil.

Loamy soils—natural mixture of sand and clay, good for roots and rich pasture.

Clay soils—heavy for plough, though good grain land, and permanent pasture.

In Cheshire farming is chiefly influenced by the county's position between two manufacturing areas, creating a demand for dairy products, eggs and fresh fruit and vegetables.

Hence (a) sheep on poorer but well-drained hill pasture ; (b) cattle and horses on wet, rich lowland pastures, with pigs to use up surplus products ; (c) ploughed land chiefly given up to fodder crops on warm red soil ; (d) fruit in sheltered, suitable districts, e.g., strawberries at Farndon.

3. CLOTHING.

Man's use of animal, vegetable, and mineral wealth to supply his clothes, with examples. Cheshire's clothing industries and the reasons for their growth.

Silk—pure water.
Chemicals and dyes—salt.
Leather—cattle and oak bark.
Hats—wool for felt.
Soap—salt and imported oils.

4. COMMUNICATIONS.

A. By water. Influence of rock structure on river development and canal construction.

B. By road. Influence of configuration, surface, and kind of road metal obtainable.

.C. By rail. Geology determines relief to a large extent, and consequent ease or difficulty of railway construction.

In Cheshire—

Estuaries of Mersey and Dee as influenced by rock structure.

Rivers too short to be of great value, but canals easily cut over clay plain.

Roads easily made over plain with local "crowstone" for metal.

Railway construction facilitated by nearness to iron districts and port of import of Canadian timber.

Ancient Greece. S. CASSON. 96 pp, map, table, illustrations. 13 x 18.5 cm. Oxford Univ. Press. 1922. Bound.

To the geographer whose view is broad enough to include the living past, this little book of reflections upon the growth and decay of the Greek City State will prove interesting, and many of its references will be found well worth following up. It by no means takes the place of Zimmern's "Greek Commonwealth," which should be widely used by geographers, but it is full of vital touches, due to Mr Casson's personal contacts with the Greek coasts under the stress of war. The city-state still lives in the isles of Greece, and the heritage it has left to us is such a vital matter for Europe's renewal after the war that this little book is well timed. May it help forward a revival of the humanities in education, a revival in which interpretative geography shall be allowed to play its part as it did in Greece long ago.

The Oxford Press has issued several more books in the same series as Mr Casson's. As **"The Peoples of Europe"** (H. J. FLEURE, 2/6) is written by the Editor of this magazine, it will not be reviewed in these pages beyond the general statement that it attempts a summary survey of the development of the modern life of Europe, sketching its prehistoric background and leading on through the village-civilization stage to the growth of overseas commerce and the revolution due to coal and steam power, and beyond that to the recent war and the prospective changes of the present critical time. The **"History of British Agriculture,"** by JAMES ORR, will interest many readers who are concerned with local studies in rural districts, as well as students generally. The treatment is a broad one and emphasises the social side, so that from this little book we get a real glimpse of the way in which the British people has come to be as it is so far as rural life is concerned. In several parts of the book the difficulties are treated rather lightly, and there is not quite sufficient appreciation of the fact that a rural population in health and wealth is the only way to keep up a standard of quality and to combat the race deterioration that accompanies large scale industry. The book reveals unobtrusively the writer's long course of reading and thought, and it would have been an advantage to give the student at the end of the book a short statement of the books to be studied if he wishes to expand his knowledge. The author refers, perhaps rather too briefly, to the improvements in stock-raising that followed the spread of root crops, and one wishes he had in this connection referred to the influence of continental upon British farming. The illustrations are very interestingly chosen to set forth the contrast between old and modern methods and implements, and the old methods are illustrated from copies of contemporary sketches wherever possible. The remarks about improvements of breeds of animals and the spread of the horse are enlightening. **"The Expansion of Britain,"** by W. R. KERMACK, has had the advantage of criticism and revision by Sir Charles Lucas. It opens with a short account of some factors of the voyages of discovery, and this is followed by a chapter on the growth of sea-power, a chapter which might well have been broadened into one on the growth of Britain's interest in the sea and on the developments of shipbuilding and maritime knowledge and skill which led men on to trade, and so in the end brought to England the raw materials that encouraged the fateful development of her large scale manufacturing industry. The next sections touch British North America, the Indian Empire, the Union of South Africa, the Commonwealth of Australia, the Dominion of New Zealand. In each case some attention is given to physical features and useful maps are provided, but this only makes a historical and general atlas the more necessary for the student. The importance of the railways to Canada, the concentration of the westward ways to pass through Winnipeg, the limitations on Canada's seafaring interests, the hard winter as a protection from "the colour problem," are all points of interest brought out in connection with the greatest of the Dominions. The physical background occupies the main attention of the writer in his chapter on India, which is correspondingly less satisfactory than it might be. The other Dominions are discussed reasonably without much attempt at fresh thought, and the book concludes with a short chapter on Seaways of the Empire.

FROM

Mr. HERBERT RUSSELL'S LIST

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A NEW GEOGRAPHY OF SCOTLAND By MARION I. NEWBIGIN, D.Sc. (London) F.R.G.S. Editor of "The Scottish Geographical Magazine" With 23 Maps and Diagrams. Crown 8vo, cloth, **Reduced Price, 3s.** net.

The book is intended for pupils nearing the end of their school course, and its object is both to give a general summary of the geography of the country, and to afford an insight into modern methods and results. Thus such subjects as the causes of the localisation of industries, and of the growth or decay of towns; the relation of railway routes to land forms; the reasons for the peculiar distribution of population, and so on, are discussed in some detail.

THE "LEADING" MAPPING BOOK. Patent No. 16039/15. By W. LUCAS, B.Sc., Southchurch Hall School, Southend-on-Sea. Size 9 x 8½ inches, **Price 6d.** net.

"This is a simple and ingenious school note-book, intended to be used for the detailed study of a country or region. It contains a series of sheets of stout paper for notes, diagrams, sketches, etc., to which are attached tracing sheets for maps. The outline of the area which is being studied can be traced direct from the atlas on the last of these sheets, and copied from this on the other sheets. The various outlines can then be filled in to form orographical rainfall, population maps, and so forth. Comparison of any two types of map is easy, and superimposition, e.g., of an orographical upon a population map is also possible. When filled in the book should thus contain a fairly complete summary of the geography of the area studied, while the labour of drawing a number of outlines is minimised." —"The Scottish Geographical Magazine."

The Publishers will be pleased to lend a **Scholar's Worked Copy** for examination on application, and will be grateful to **teachers** who can supply **copies** for that purpose from schools where the book is already in use.

ENVIRONMENT: A NATURAL GEOGRAPHY By G. R. SWAINE, F.R.Met.S., Lecturer in Geography at the Manchester Day Training College, Crown 8vo, cloth, 224 pp. **Price 3s. 6d.** net.

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A DIGEST OF BRITISH HISTORY By S. H. McGRADY, M.A. (Cantab). Bromley County School for Boys. With an Introduction by Oscar Browning. Crown 8vo., cloth, 352 pp. Just Published. New and Revised Edition. **Price 4s. 6d.** net.

Also published in three parts as under; Part I.—B.C. to 1485. Part II.—1485 to 1789. Part III.—1789 to 1912. **Price 1s. 4d.** net.

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For details of Heaton's "Scientific Geographies," "Junior Scientific Geographies," "Comparative Geography of the Six Continents" and "Regional Geography of the Six Continents." See Prospectus enclosed with this issue.

Copies sent on APPROVAL on application to

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A Note on Malaya.

Received from P. L. Dickson, F.R.G.S., F.Z.S., M.R.A.S., etc.

WHEN one of our most famous universities sends a letter to Singapore, India, it seems time that something should be done to remove the remarkable ignorance of Malayan geography that is general in England.

The Malay Peninsula falls under four divisions :—

(1) The Straits Settlement, a Crown Colony, including :—
   - (a) Singapore Island.
   - (b) Prince of Wales Island, commonly known as Penang, with the adjacent strip of mainland known as Province Wellesley.
   - (c) Malacca, by far the largest division.
   - (d) The Dindings.
   - (e) Labuan Island, off the N. coast of Borneo, the Cocos Islands and Christmas Islands, though outside the Peninsula, are included in the Straits Settlements.

(2) The Federated Malay States, each under its native ruler, though practically ruled by British Residents acting under the High Commissioner, who is also Governor of the Straits Settlements. These are :—
   - (a) Perak.
   - (b) Pahang.
   - (c) Selangor.
   - (d) Negri Sembilan.

(3) The protected native states, which are almost as completely under British control as the federated states. These are :—
   - (a) Johore.
   - (b) Kelantan.
   - (c) Trengganu.
   - (d) Kedah.
   - (e) Perlis.

(4) The southern part of the kingdom of Siam.

University College of Wales, Aberystwyth.

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A Quasi-Secant Conical Net.

REV. A. J. POTTER, Reading University College.

THE old-fashioned Secant Conical Projection has had to give ground in these days to the Two Standard Parallel network, an elegant arrangement, which has gained favour through its minimisation and distribution of scale errors, as well as its usefulness as a basis for a series of other " projections" such as the Two Standard Conical Orthomorphic and Conical Equal-area. Its inverse method of construction and the somewhat alarming appearance of its formulæ, however, make it difficult for a student of intermediate grade ; and it has occurred to the present writer that the accompanying direct construction, which minimises and distributes the scale errors, at least as well as the Two Standard Parallel, would be a useful step to more advanced work.

It would enable the student to avoid, for example, by contrast, the pitfall of supposing that the centre of the Two Standard construction is a point on the prolonged axis of the sphere. In the figure, a rather extreme case chosen for the sake of clear drawing, E A B P is a quadrant of the sphere in section, C being the centre, P the pole, E a point on the equator.

The cone cuts the sphere, in the case chosen, through Lat. 70° and Lat. 30°, so that $DCB = 20° \quad BCO = 20° \qquad \therefore\ DCO = 40°,\ DOC = 50°$

In the triangle BOC

$$\frac{OB}{\sin BCO} = \frac{BC}{\sin BOC}$$

$$\therefore\ OB = BC.\frac{\sin BCO}{\sin BOC}$$

$$= \frac{R.\ \sin 20°}{\sin 50°}$$

Assuming the earth to be a sphere with radius 6,371,300 metres* and taking a scale of 1 : 100,000,000.

$$OB = 28{\cdot}45\text{mm}.$$

In any convenient direction draw O F′ for the Central Meridian

With radius O B draw an arc cutting O F′ at B′.

From B′ step off a convenient number of latitude intervals to scale (10° along a great circle = 11·12 mm.)

Through the points so obtained strike arcs concentric with B B′. Let A′ correspond to A, but note that B′ A′, being equal in length to the arc B A and not to its chord, the parallel through A′ will not pass through A.

From A′ step off a convenient number of longitude intervals to scale. (10° of longitude at latitude 30° = 9·63 mm.)

To avoid the inaccuracy of treating small arcs as identical with their chords, and of cumulative errors which will result from a series of small steps, it is well to lay off a large arc, say 40°, of longitude by means of its chord length (=33·20 mm.) and obtain 10° (or 5°) spaces by repeated bisection. From O draw straight lines through the points so obtained, and the network is complete. The construction quadrant may then be rubbed out.

Reference has been made to scale errors, and the following table of errors per cent. along the parallels may be of interest. The case chosen for tabulation is one in which the cone is secant through 50° and 40°. These have also been taken as the errorless parallels for the Two Standard, while the One Standard has been made errorless along its parallel of tangency half-way between 40° and 50°. Other cases give similar results.

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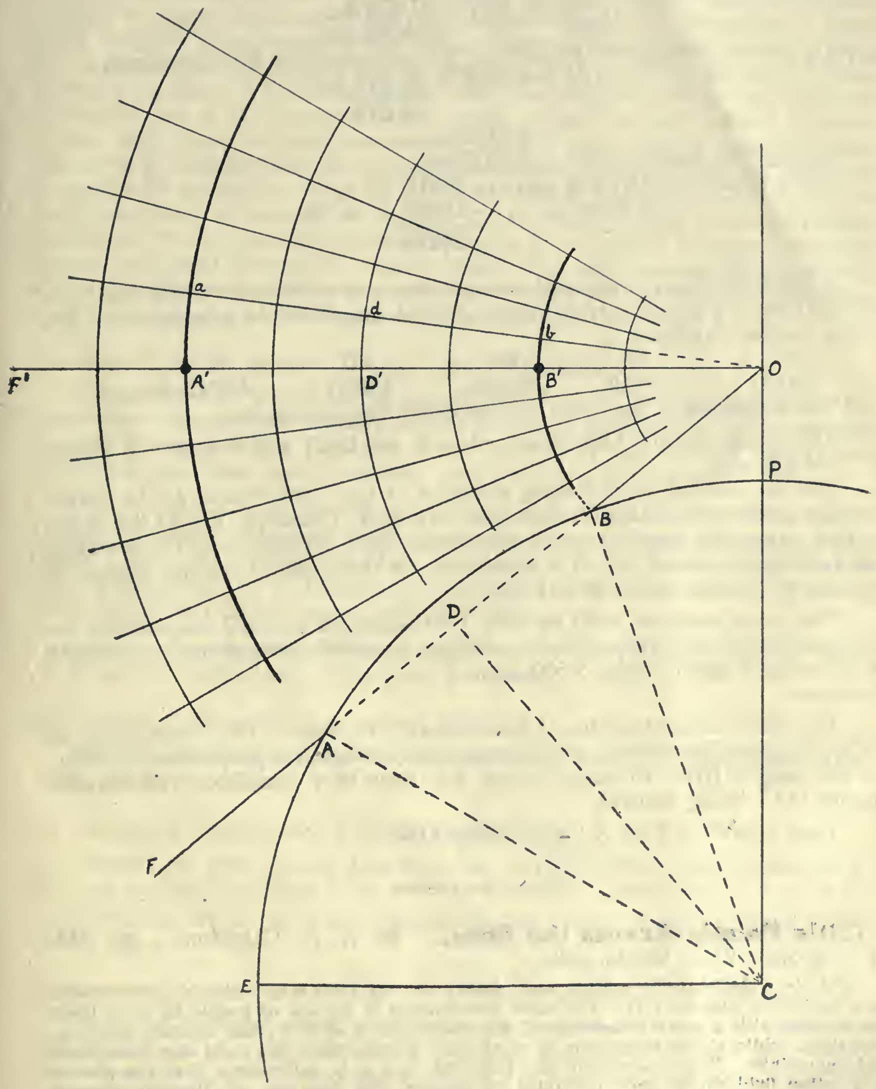
*Geographical Teacher, Vol. VI., pp. 330, 331.

Comparison of scale errors per cent. :

Lat.	One Standard	Quasi-Secant	Two Standard
55°	+1·76	+1·29	+1·33
50°	+ ·41	— ·02	
45°		— ·39	— ·38
40°	+ ·36		
35°	+1·39	+1·05	+1·04



The quasi-secant might be made errorless along the first obtained parallel, through B′, or along one half-way between the two, but neither of these gives such satisfactory results.

A simple method, given the true lengths, as below, of obtaining the map lengths along the parallels (and the percentage error) may be added.

On the map, let A′a be a length along the errorless parallel, whose radius is OA′, and D′d a length along some other parallel whose radius is OD′.

From similarity of sectors:

$$\frac{D'd}{A'a} = \frac{OD'}{OA'} \qquad \therefore D'd = A'a \,.\, \frac{OD'}{OA'}$$

In the case tabulated $OB' = 57{\cdot}918$ mm.

$$\therefore OD' \text{ (at } 45^\circ) = 63{\cdot}478 \text{ mm.}$$

$$OA' = 69{\cdot}038 \text{ mm.}$$

and A′a is its true length = 4·2592 mm. for an interval of 5° in longitude.

$$\therefore D'd = 4{\cdot}2592 \times \frac{63{\cdot}478}{69{\cdot}038} \text{ mm.}$$

$$= 3{\cdot}9162 \text{ mm.}$$

but the true length at 45° = 3·9315 mm.

∴ D′d is too small by 153 parts in 39315

$$\therefore \text{Error } \% = -\frac{15300}{39315} = -{\cdot}39$$

As several places of decimals are necessary in order to yield the exactness of the table, we give the true length of 5° of longitude on a scale of $1 : 10_8$ at the various latitudes.

55°	50°	45°	40°	35°
3·1891	3·5739	3·9315	4·2592	4·5545 mm.

The procedure is the same for the other two networks.

The radius for the One Standard is R cot Lat., which at 45° is simply R = 63·713 mm.

For the method of obtaining a radius in the Two Standard, the reader must be referred to " Map Projections " by A. R. Hinks (p. 81) as the object of this paper has been to avoid the rather more complicated trigonometry and technical notation which it involves. In the chosen case the radius for parallel 40° works out as 69·111 mm.

The other radii for the One and Two Standard Parallel respectively are obtained, as before, by successive addition or subtraction of the scale length of 5° along a great circle, 5·560 mm.

NOTE :—

To obtain chord lengths, it is necessary to know the angle, such as A′Oa between Meridians, which angle bears the same proportion to 360° as the length (true to scale) along A′a does to a complete circumference (radius OA′ being known).

$$\text{Then chord} = 2 \sin \frac{A'Oa}{2} \times \text{radius } OA'$$

Little People Across the Seas. By K. A. CAMERON. pp. 144. 7½in. x 5in. 2/-. McDougall.

This is a delightfully written and clearly printed book which should prove useful as a reader for Standard II. The short descriptions of the life of people in other lands are written with a good knowledge of the child's point of view, and contain much information, while at the same time treat of those things which the child can understand and appreciate. The illustrations are excellent, but it is unfortunate that the picture of a cotton field should face a chapter on Canada, and that one of Russian peasants should face a chapter headed " Picking Oranges." H.A.W.

Notes for Students of Economic Geography.

O. H. T. RISHBETH.

THE student of economic geography is frequently faced with the difficulty of obtaining reliable up-to-date materials. Foreign official publications, even when they are reliable and are regularly issued, are notoriously difficult to trace and to obtain; handbooks (e.g., the Statesman's Year Book and the Year Books of the various British Dominions) are in general too dry, condensed and statistical to convey much to the average student unless he is already well acquainted with his subject, and in any case the intelligent use of such works is not easy. Even British official (Governmental and other) publications—which, by the way, besides being reliable, appear to be steadily increasing in general human interest, and are therefore becoming of increasing value to the researcher in geography—are none too easy, even now, to unearth, although H.M. Stationery Office (Imperial House, Kingsway, W.C.2) issues annual summaries of all official and parliamentary reports published during the current year. But even possessing these lists, a discriminating selection is esential. Below we offer a few hints (covering very limited fields) which may prove useful to some students.

DEPARTMENT OF OVERSEAS TRADE REPORTS (British).

These reports, which are based on official data, are in our opinion the most helpful for general purposes to the economic geographer, and supersede the old Diplomatic and Consular Reports. They are written by experts, and are on the whole most readable. As instances we may cite:

General Reports on the Trade and Economic Condition of: Italy (dated December, 1920) (published 1921) (1s. net); Greece (dated February, 1921) (1921, 1/9); Morocco (dated May, 1921) (1921, 2s.); Spain (dated December, 1920) (1921, 1/6); Turkey (for year 1919) (1920, 2s.); (dated January, 1921) (1921, 2s.); Germany (published 1922); etc.

Also: Geology and Mineral Resources of Serb-Croat-Slovene State (Ref. no. F.E. 383) (1921, 3/6) (map and plans); etc.

(2) COLONIAL RESEARCH COMMITTEE (British).

First Annual Report (for year ending December 31st, 1920) (Cmd. 1144) (1921, 5d.); etc.

(3) OVERSEAS SETTLEMENT COMMITTEE (British).

Report for year ending December 31st, 1920 (Cmd. 1134) (1921, 6d.); for year ending December 31st, 1921 (Cmd. 1580), (1922, 6d.).

First Report of the Royal Commission on Wheat Supplies (Cmd. 1544). (1921. 5s.).

(4) COMMONWEALTH OF AUSTRALIA: OFFICIAL GOVERNMENT PUBLICATIONS.

Some of the later official reports have a permanent scientific value (e.g., the Memoirs of the Commonwealth Advisory Council of Science and Industry. Memoir I., 1918), and many others are indispensable for a serious student of Australian conditions (e.g., the various Commonwealth reports on the Northern Territory, including Medical Congress reports; railways and ports; administration, etc.). A summary of such publications is printed near the front of the Commonwealth Year Book each year, and the Official Secretary, Australia House, Strand, London, W.C.2, courteously supplies such reports as he has available for distribution, besides offering advice and suggestions to enquirers. Other reports (e.g., detailed geological surveys, mining, industrial and railway reports) can usually be obtained from the Agents-General for the various States (for addresses see Commonwealth Year Book Index). Nevertheless, in spite of the extreme courtesy and willingness of the London representatives, many of these reports are regrettably difficult to obtain.

As instances of useful Commonwealth Reports may be cited: Reports on Commonwealth Railway Operations to 30th June, 1918, 1919, 1920, 1921, etc. Rightly understood and used, these reports are at once an epitome and illustration of Australian physical, economic and social conditions, and are full of highly interesting and useful material. They also contain up-to-date railway-development maps.

The above hints, restricted as they are, may serve to indicate the kind of sources which are available for the serious student. There is also a vast quantity of valuable material in the reports of special Government departments, but a very great deal is only to be had by individual and persistent application.

Two works which may prove useful to the student of modern Italy are:

(1) An Atlas: L'Italia e le sue Colonie, by G. Assereto. Published by the Istituto Geografico de Agostini. Novara. (Lire 8).

This contains many useful economic distribution maps, besides a letterpress (in Italian) illustrating the (pre-war) economic development of Italy.

(2) R. F. Foerster: Italian Emigration of our Times. (Harvard Economic Studies. Vol. XX.). London. Humphrey Milford. 1919. 12/6.

Incidental to an examination of modern Italian emigration, this work affords some insight into the economic and geographical conditions of Italy and most of the lands to which Italian emigrants penetrate in numbers (e.g., France, Germany, Switzerland, Austria-Hungary, N. Africa, Argentina, Brazil, U.S.A.). The review of this work which appeared in the 'Geographical Review,' January, 1922, p. 146, is worth perusing before buying or reading the book itself.

University of London, University College.

GEOGRAPHY.

E. J. GARWOOD, M.A., Sc.D., F.R.S.	Professor of Physical Geography.
L. W. LYDE, M.A.	Professor of Economic Geography.
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Reviews.

Northmost Australia. R. Logan Jack. 2 Vols. 1921. Simpkin, Marshall, Hamilton, Kent and Co., Ltd. £3 3s. 0d.

The practice—now almost a tradition—followed by the Australian Governments of employing geologists to investigate the natural resources of their territories is having one useful if undesigned outcome: Australian geography, more especially the geography of Northern Australia, is being based at last on bed rock. The late Mr Logan Jack* is one of those scientists from the Homeland to whose dispassionate investigation Australia owes much.

By " Northmost Australia " is meant strictly Cape York Peninsula, but the method of treatment adopted has necessitated the virtual inclusion of the whole northern half of Queensland (p. 5). The merest glance at the map is sufficient to impress the observer with the importance of Torres Strait to Australia and the British Empire (p. 736); add to this the enthusiasm and passion for perfection of the author, and the 768 full pages devoted to the partial consideration of an area thus limited will not seem too many.

The genesis of the work in its present form is explained in the introduction (cf. Cap. LXVII.), and what makes these volumes so attractive—and may we say, unusual?—is the spirit which informs them, viz., the scientific spirit applied equally, with critical appreciation, to unravelling the intricacies of historical narrative and developments no less than the field-problems of geology, geography, and human relations. True, this combination of gifts is at first onset somewhat formidable, and not even the three admirable indices (the subject index misses one or two useful references) or the chapter-synopses—amounting almost to ' precis '—quite banish our initial shyness. It is a pity that the sixteen maps (excepting the index map) add, if anything, to our confusion. But this confusion is short-lived; the easiest way to dispel it is to take the author's hint (p. 3ff.) and see how the book arose. We find three main parts, fairly distinct in content and treatment, if not in arrangement, besides a certain small amount of incidental matter scattered rather inconsequentially about the work. The work as a whole is so valuable that it may be worth while to indicate these divisions:—

I. History of Earlier Maritime Discovery and Exploration (c. 1600—1845 A.D.). Chapters II.—XXV. (inclusive) and Cap. XXXVII. describe the progressive charting and description of more especially the coastal areas by Portugese, Dutch, French, and British explorers. Original accounts are extensively quoted (foreign sources in translation), and the section as a whole makes fascinating reading. It gains moreover an almost unique value from the critical control exercised over it by an editor who is also a scientist and fellow-explorer, minutely versed in the region's geography.

II. History of Later (chiefly land) Exploration (c. 1845—1879). The bulk of capp. XXVI.—LXV. is devoted to this topic. The treatment is more extensive. A great deal of local history and topographical detail is enshrined in these pages, and occasional narratives which will live as history (cf. capp. XXX. ff.: Kennedy's Expedition); not any of them are dull, though the diary form and multiplicity of detail (e.g., river descriptions and exploration), sometimes oft repeated, demands patience. A summary of each explorer's " contribution to geographical knowledge " such as is given for Hann (pp. 410 ff.) would have been an advantage.

III. Exploration by the Author and Subsequent Travellers (c. 1879—1916). This (capp. LXVII.—XCVIII.) is the weightiest portion of the book, and amounts to a detailed geological and topographical description in extenso, along with much personal and semi-historical reminiscence. As more recent times are reached a statistical element appears.

The citation of authorities and a series of very full bibliographies throughout greatly enhance the value of the work for the student, and an appendix, say, of topographical illustrations would have enhanced it still more.

Though not a " geography book," this work should be in every geographical research library. It serves as a guide to a wide range of literature—historical as well as geographical—dealing with N. Australia. In itself it is a storehouse of multifarious information upon the same region. To cite just a few of the topics which have struck us: there is information upon ethnology and anthropology (native social customs, trade, migration, family relationships, contact of white and black); conditions of trade and navigation in N. and E. Australian waters; geology in relation to topography; physical geography and geographical processes (including climate and vegetation); history of cartography; developmental processes in a new country (growth of pastoral and mining interests; selection, naming, and growth of settlements), and so on.

Not the least interesting to a student of things Australian are the author's—somewhat elusive—references to social and economic conditions. Chapter LI. is a valuable and discriminating survey of the " coloured labour " question in and around N. Queensland, but we think the author does less than justice to those "ignorant" (the word is not the late Mr Logan Jack's) men who, in spite of their crude and somewhat selfish extremism and their short-sighted blundering (cf. p. 738), are still in the van of the fight of the "common man" for a decent life and who will not yield their bodies and souls without a struggle into the jaws of unmitigated industrialism. The author's estimate of the potentialities and settlement of Northern Queensland as a whole (v. Conclusion, pp. 736 ff.) are, we believe, in line with modern informed opinion, and we are disposed to believe that much of the "wet desert" will prove quite as productive as so much of the dry desert has already done. O.H.T.R.

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*We note with regret the death of the author, an obituary notice of whom will be found in the Geographical Journal for April, 1922.

Principes de Geographe Humaine. P. Vidal de la Blache, arranged after the author's death by E. de Martonne. 328 pp, 25.5 x 16.5 cm, and four folded coloured maps. Armand Colin, Paris, 103, Boulevard. S. Michel. 25 fcs.

The geographical world had had foretastes of this work in the author's articles in the Annales de Géographie, and one may discern many influences of the master in the work of his disinguished pupil, Jean Brunhes. It is none the less valuable to have his own book, albeit a book prepared for press by the filial devotion of E. de Martonne. One may say that it differs from nearly all other attempts not only in the width of knowledge on which it is based, but also in the understanding which allows the great teacher to weld together history and geography and so to rise above the elementary crudities and analogies which attract the less thoughtful. This book gives us a good deal of the essence of the thought of Vidal de la Blache, and if it has not quite the literary grandeur that his love of motherland gave to many parts of the famous "Tableau de la Géographie de la France," it is none the less a pleasure to read.

The author wonders whether man might not have progressed more effectively had he studied his fellows scientifically a little more and himself subjectively rather less, and many will agree with him here. As in all his works, he shows his deep appreciation of physical factors, and urges the importance of vegetation maps as a summary of those factors especially valuable for the student of human relations. At the same time he remembers that man is an agent and affects especially the more mobile elements of the earth's crust in endless ways, as the decay of Mediterranean fertility and the disappearance of the huge ancient forests north of Alps testify.

For Vidal de la Blache geography is most deeply concerned with distributions, and he discusses the distribution of mankind, the factors of varying densities and of movements, making his argument culminate in a survey of the facts concerning the regions of maximum density in past and present.

The forms of civilization are studied under the headings of materials of study, foods, constructional materials, habitations, progress and stagnation in civilization, contact influences. Next, circulation is studied in a sequence of argument that deals first with means of transport (men, animals, vehicles), and subsequently touches upon ways of transport, roads, railways, and sea-ways. The editor has added a further section of "fragments" from the author's notes that make one regret more than ever the fact that his work is at an end. An index allows the reader to gather together the references to particular regions and so on. The four large maps give distribution of population, materials derived from vegetation, material derived from animals, and constructional types and materials, while two maps in the text show distributions of large scale cereal culture and distribution of towns around arid regions respectively. The latter map is most suggestive. No doubt had it not been for the war the book would have been far larger and much more richly illustrated, but we thank Professor de Martonne for what his loyalty to his teacher has enabled him to do, and pay our tribute of admiration to the late leader of the great school of French geographers, we fear for the last time, in the review columns of this journal. His influence has been immense, and his breadth of learning and of sympathy shine almost as clearly from the pages of his works as they did from his personality at the lecture desk. In dealiing with a work of such special dignity and interest it has been thought more appropriate to give a short summary of its contents rather than to take up and discuss points here and there.

The Oxford University Press, 1468—1921. 112 pp. 1922. Bound.

It will interest many persons to know that this famous press has just issued a richly illustrated survey of its multifarious activities in past and present. The Press is one of our national institutions, and its work a source of pride to all who care for British learning, and we can but hope that some day soon it may be moved to add to the "English Dictionary" and the "Dictionary of National Biography" that Dictionary of Geography which we all need, based on the same sound and scholarly principles as the works just mentioned.

A Text Book of Geography. A. W. ANDREWS ARNOLD. 7/6.

A second edition of this well-known and valuable textbook is now available, with statistics revised and with the political changes due to the war noted.

Human Geographies (Secondary School Series). J. FAIRGRIEVE and E. YOUNG. Book II. The Atlantic Hemisphere. 19 x 12.5 cm. 287 pp. + Appendices. Philip and Son. 3/-.

Teachers will welcome the second part of this valuable series, which develops the scheme so ably begun in Book I. reviewed in our last number.

Commercial Geography of the British Empire. L. W. LYDE. viii. + 146 pp. 19.5 x 13 cm. Methuen. 1922. 3/6.

A revised edition of this well-known little book omits the purely physical sections of the original introduction to make room for new matter, the argument being that good books on physical geography are now numerous. The introduction now includes short sections on population, economic bearings of climate, economic bearings of relief, transport and war. In the transport section we note thoughtful remarks about the limited value of canals in Britain, with our relief compelling us to have one lock per 1¼ miles of canal, and our trading custom of frequent purchase of small lots as a protection against change of taste. The consideration of our routes and our provision in war time is interesting and suggestive. In the detailed section the British Isles get 22 pages, Dominion of Canada 20, Australia 14, India and Ceylon 12, South Africa 15, the rest of British Africa 6, New Zealand 7, and minor British possessions 1. The book is thus concerned mainly with products and their export rather than with the commercial network which Britain has organised, in which "minor" possessions like Singapore and Hong Kong play an important part. The student is expected to use an economic atlas with this work.

Provinces of Ireland. Edited by G. FLETCHER. 19.5 x 13.5 cm. Camb. Univ. Press. 1922. Leinster, xiv. + 256 pp., 7/6. Connaught, xii. + 172 pp., 6/6.

Each book has a geological map as an end piece and a folding orographical map of the province. Ulster and Munster have already appeared in this series and have been noticed in this magazine, and the fifth and last volume is to deal with Ireland as a whole. The same able company of specialists have combined to help Mr Fletcher, who is much to be congratulated on the successful issue of his enterprise. We may be allowed to repeat our appreciation of books with contributions by Macalister, Cole, Swain, Praeger, Armstrong, Best, and the editor. The Connaught book is full of interest about the strange monuments of the past, not only monuments made by man, but remains of the ancient so-called Lusitanian flora and fauna, with its possible American relationships dating from the time before the North Atlantic gained its present form. The Leinster volume includes some remarkably clear diagram maps to illustrate points in physical geography. This volume is treated in two parts, of which East Leinster gets 170 pages and West Leinster the remainder.

Philip's Contour Map of Central Europe, 1 : 1,500,000, with railways, canals and main roads. International boundaries faintly indicated. On cloth, dissected and folded in case. 25/-.

This map is of considerable value for reference; the colouring is orographical in greens and browns, but very subdued, so that neither it nor the myriad place-names clash heavily. The map extends to about longitude 20° E. and includes England and Wales on the west. Its latitudinal limits are approximately 42° and 55° N. It therefore shows the Alps and their flanking lands completely, while it gives the European plain westward from the borders of Russia. It could be used for class demonstration purposes, though more specially intended for reference, as the colouring is not striking enough for the other purpose. The faint indication of international boundaries is in some ways most appropriate at this time of unrest, and there have been one or two adjustments already since the map appeared; a purchaser can make these adjustments and can at will emphasise the boundaries for himself. The orthography seems to be most often, but not quite always, in accord with that fixed by the British R.G.S. Committee. We hope to see a companion map of East Central Europe, and trust that in preparing it care will be taken to include all Jugoslavia. Old map areas still sway us so strongly that we lack a good reference map of Jugoslavia. The map of E. Central Europe should start just west of Czechoslovakia, and should at least reach from the Gulf of Finland to the Ægean Sea.

The Province of Quebec. J. C. SUTHERLAND. Renouf Publishing Co., 25, McGill Coll. Avenue, Montreal. Paper covers, 23 x 15 cm, xvi. + 159 pp. 1922.

This is entitled a book for the general reader, and is illustrated by six half-tone photo reproductions. The first 66 pages describe the geological features of the province, and then climate, economic history, forests, manufactures, mining, and fish and game are discussed. The civil government and educational system next receive attention. The last chapter is an interesting one on geography and human culture, with special reference to the province. Quebec, as a province where Catholic and Protestant, French and English have to live side by side, is a subject of very general interest, and we are indebted to Mr Sutherland as a local expert for producing the book. In a future edition a chapter on the trade relations of Quebec province would be valuable; its links with the St. Lawrence mouth and with New York via Lala Champlain need to be compared.

Cambridge Geographical Text Books (Senior). G. F. BOSWORTH. xiv. + 508 pp. 20 x 14 cm. Univ. Press, Cambridge. 1922. 7/6.

This work, on fairly orthodox lines, is intended for the pupils of the higher forms of central and secondary schools. It has the advantage of a valuable contribution from Mr A. R. Hinks, F.R.S., who has written the chapters on the shape and size of the earth, the seasons, maps and surveying and map projections. The book is illustrated by a large number of photographs, many of welcome freshness, and there are certain maps and diagrams chiefly of matters not easily found in all good atlases. The treatment is chiefly under countries, Europe as a whole getting only a few pages preliminary to the discussion of one country at a time. As a textbook should supplement rather than replace teaching, this scheme is quite a useful one, giving ease of reference and allowing the thoughtful teacher scope for his own efforts. Under each heading the sequence of treatment is the usual one of Position and Extent, Surface and General Features, Climate and Rainfall, Productions, People and Industries, Trade and Communications, Towns with small variations, and this again eases reference and need not cramp the teacher, who should work out his own scheme of vivid presentation of a living, working world with a long past and a difficult future.

The Golden Fleece. G. W. MORRIS and L. S. WOOD 224 pp., 19 x 13 cm. Oxford Univ. Press. 1922. 3/6.

This book disappoints at first sight because it is not a discussion of early sea trade based on the story of Jason, but apart from the use of this title there is a great attraction about this thoughtful survey of wool in England from the days when Alfred's daughter married Count Arnulf of Flanders, and a connection began which did so much to determine the course of British trade and brought back to Britain in the long run immense contributions of commercial enterprise and experience. That the authors are alive to the side-issues of the matter is shown by their account of the churches which grew out of the prosperity of the wool trade in the later Middle Ages; the distribution of these perpendicular buildings is interesting and needs mapping. The distribution of Cistercian foundations is another subject needing mapping in connection with the early development of our wool trade, ad many a teacher uses the example of the old Cistercian house which is now St. John's College, Oxford, situate upon St. Giles', the old sheep market, and still a fair ground, without the walls just at the entry into Oxford of the road from Woodstock and the Cotswolds. The later and much longer section deals with the evolution of modern conditions. There are many illustrations, including a map of the distribution of the wool industry in 1470 based on Aulnage Returns.

The People's Atlas ("The World Transformed"). 56 pages of maps and diagrams, 24 pages "Illustrated literary supplement," 8 pages "Diary of making of war and peace," 11 pages "Commercial Compendium," 37 pages gazetteer. Publ. Newspaper House, 169-70, Fleet Street. 1922. 34.5 x 26.5 cm. One guinea.

This production may be understood as an indication of the layman's increased interest in matters of geography. Its literary portion discusses the League of Nations and the treaties, and is illustrated by a collection of photographs of prominent men, a rather miscellaneous collection. The maps, which are printed for the publishers by Messrs G. Philip, include a number giving position of the long battle fronts, a few historical maps, maps showing colonial dominions, maps showing distributions of forms of government, and so on. Unfortunately the boundaries of European units are those of 1919, and need revision already from Esthonia to Silesia as well as in the Dardanelles region. Though the endeavour to be topical is very clear, there seems to be no map of Silesia, and the whole book appears to be inadequately thought out for its purpose of helping the layman to follow geographical matters.

Oxford School Atlas for Australia and New Zealand. Eight uncoloured and 32 coloured maps. 28 x 22.5 cm. ; limp covers. Oxford Univ. Press. 2/6.

The uncoloured maps give rough ideas of relief; the coloured maps show either political or economic distributions. Some of the latter would be found interesting and useful by teachers specialising on Australasia in this country. Plates 3—16 deal with Australia and New Zealand and (one plate) Oceania. We hope the Press will some day issue another edition with coloured relief maps, without omitting the economic maps of the different states of the Commonwealth given in this one. The map of Oceania should show depths of the sea.

New Political Map of Europe. G. W. Bacon. 100 x 75 cm. 1 : 7,250,000, Bonne's Projection. 7/6 mounted. Larger size, 150 x 120 cm, 21/.

This map is already out of date in certain details and likely to need further adjustment shortly if a settlement between Turkey and Greece and the Western Powers is arranged. The splitting up of Russia shown on this map is problematic, and Oesel as well as Dago Island belongs to Esthonia, while the Alands belong to Sweden. The southern ends of the lines of longitude have dials giving the local true time (not standardized clock time) when it is noon at Greenwich. Will publishers please give us political boundaries marked in black, and not too thickly, on layer-coloured maps, so that we may teach the transitoriness of political boundaries in contrast to the durability of physical relations?

Cassell's New Atlas. 1921. 144 maps, index of 35,000 names. 35.5 x 26.5 cm. Cloth 21/-, half leather 31/6.

This atlas specialises on maps of the administrative divisions of countries and has the intention of giving the new boundaries, but, as everyone knows, they have changed and are changing; they are, however, well done in this case, though the latest arrangement about Upper Silesia is not recorded. Maps of war fronts and the like are given in some detail, and the attempt has been made to produce an atlas which will interestingly supplement, though it cannot in any sense replace, the atlases with good orographical maps. The detailed maps of parts of South Africa, North America, Central America, and so on, are maps not very often found in ordinary atlases, and there is a map of the East Indies which is an unusual boon, though it should have included a little less of China and a little of Australia. The maps have a large selection of place-names, and the atlas is useful and well executed on the whole.

Historical Atlas of S. Africa. E. A. Walker. 26 maps of various sizes on 22 pages, a few double. 22 pp. text. 38 x 25.5 cm. Stiff covers. Oxford Univ. Press. 10/6.

The scheme of this atlas will be best understood from a short enumeration. The first map gives Africa, etc., 1560, to show trade relations and stations, and the first nine maps all deal with the period before 1815. Maps of the 1820 Settlement, the Bantu Devastations and the Great Trek, the changes of eastern boundaries of Cape Colony and of the various changes right up to the Union are included. The series concludes with a set of useful addenda; a map of European population, one of native population (density tints), an economic map, a map of European expansion south of the Congo 1866—1914, an economic map of Africa, and a map of the density and distribution of the world's population 1914. This book will be found a most useful accompaniment to the wall map noticed above; the text discusses the maps seriatim.

Early Humber Geography and Hull's Water Supply. T. Sheppard. Hull Geol. Soc. 1922.

These two papers illustrate Mr Sheppard's well-known devotion to local study, and we hope he may have full opportunity to exhibit results of local study at the forthcoming meeting of the British Association, and thus inaugurate a custom which could help both the Association and the localities it visits year by year. Mr Sheppard explains in this pamphlet some further probable sites of lost towns and villages on and near the Humber, and gives maps. He now not only thinks that Sunthorpe, Ravenspurn, and Ravenserodd were outside Spurn Head, but that others were on the old north bank of the estuary, and were probably destroyed by the violent storms and floods of the fourteenth century, for which Sheppard gives quotations usefully confirming those collected by Pettersson for the Baltic Area. A short note on new borings for water at Dunswell (for Hull) is added.

THE
GEOGRAPHICAL TEACHER

AUTUMN, 1922.

Editorial.

IT is a great pleasure to announce that Sir John Russell, D.Sc., F.R.S., Director of the Rothamsted Experimental Station, Harpenden, Herts, has accepted the invitation of the Council of the Geographical Association to become its President for 1923 in succession to the Right Hon. Lord Robert Cecil, whom we thank for his public services to international thought in many directions. Members of the Association remember with appreciation the address Sir John Russell gave at our annual meetings two years ago, and many have learned to use his pioneer soil-survey memoirs. His address next January will deal with "The Influence of Geographical Factors in the Agricultural Activities of a Population," and will be given at the Birkbeck College, Bream's Buildings, Fetter Lane, E.C.4, on January 4th, 1923. Detailed notices of the meetings are enclosed in this number and should be carefully retained.

THE retirement of Colonel Sir Charles Close, K.B.E., F.R.S., is an event which moves teachers of geography to express their regret and at the same time their very sincere gratitude for all that the late Director of the Ordnance Survey has done to promote geographical education by special issues from the O.S. Office. Sir Charles Close took such a wide and high-minded view of his duties that under his guidance the fame of the Ordnance Survey both scientifically and educationally has been very high. We venture to hope that in his new found leisure Sir Charles Close may find opportunities of still further advancing the studies which he has helped in so distinguished a fashion by his life work. The appointment of a Mathematical Adviser and an Archæological Officer to the Ordnance Survey are recent but valued indications of the scientific enthusiasm of the retiring Director. Colonel E. M. Jack, C.M.G., D.S.O., succeeds Sir Charles Close, and brings to the Ordnance Survey his varied experience as chief of the Geographical Section, General Staff.

IT is with great pleasure that this Association tenders its thanks to the Board of Education for its recognition of geography for the purpose of advanced courses. The paragraph added specifies concerning main subjects of study in an Advanced Course as follows :—

> §48E. Geography, combined with two other subjects approved by the Board, of which at least one must be History or a Science.

There is a further statement that, in addition to the subjects selected under the paragraph here quoted, the pupils taking the E Course must do substantial work in a subject or subjects complementary to the main subjects of the Course.

This new opportunity makes it desirable for teachers of geography to think out schemes whenever they can, both to improve the standard of their work and to find the best combinations of subjects under the circumstances of their schools. There are still difficulties in the way of securing proper recognition of the subject by some of the examining authorities, but it is to be hoped that they will now make the necessary changes without delay.

WE gratefully acknowledge the generosity of the Bradford branch in returning the whole of its subvention for 1922. Any help from branches is most welcome, especially as an indication of the spirit of co-operation. The new opportunities mentioned in the last paragraph imply the need for extending our membership to include all teachers of geography at all grades, for rousing interest in the subject in the public mind and for promoting wide reading, to which purpose our new Library should contribute.

THE Library is now open again after the reorganization, during which over 250 books have been added. It is still not much more than the nucleus of a library, but the catalogue will be interesting to intending members. Copies may be obtained from the Head Office. They are free to library members and cost sixpence to those who do not pay the library subscription, which is 5s. per annum (the first 5s. to run till January 1st, 1924) or £2 2s. for life membership. Members pay their own postage both ways.

THERE is great need of gifts in books and money for the development of the library, and we would specially ask for good topographical works on the various parts of this country, good books of travel of any period. The Head Office will be glad to consider paying carriage on parcels of suitable books given to the library, and would draw attention to the possibility of bequests to the Association. We gratefully acknowledge the following gifts :—Mr Ernest Young, £5 ; Mr W. W. Jervis, £1 1s.; Mr C. C. Carter, 15s.; Miss E. H. McLean, 5s.; Mr S. W. Hagger, 5s.; Miss L. Winchester, 5s.; Miss H. Sowerbutts, 2s. 6d.; *Colonel H. T. Crook, V.D., M.Inst.C.E.,* Pamphlets on Topographical Subjects by the donor ; *Mr H. H. Peach,* Things Seen in Madagascar, by Sibree, Die Turkei, 1915, Banse, Die Vereinigten Staaten von Nord Amerika by Hotzch, Vienna through a camera, Norwegen by Ruge and Arstal, Neapel by Haas, Austria Hungary in pictures by Gerlach ; *Messrs Macmillan and Co., Ltd.,* In Far North-east Siberia by Shklovsky, My Life with the Eskimo by Stefansson, Melanesians and Polynesians by G. Brown, The Land of Uz by Bury ; *Mr G. N. Phillips,* The Making of Modern Egypt, Colvin, Undiscovered Russia, Grahame, The Real India, Rees, Belgium and the Western Front (Muirhead's Blue Guide), Life of Nelson, Mahan, Voyages and Travels round the World, Tyerman and Bennett, Links in my Life on Land and Sea, Gambier; *Mr A. D. Carlisle,* Complete set of bound volumes of the "Geographical Teacher"; *Dr. G. B. Grundy,* "The Ancient Highways and Tracks of Wiltshire, Berkshire, and Hampshire, and the Saxon Battlefields of Wiltshire," from Arch. Journ., Vol. XXV., 2nd Series.

IF the new Library scheme is taken up by a sufficient number of members, the Head Office proposes to add to it a loan scheme for lantern slides for library members. There is as yet no nucleus of a collection, but we hope that this appeal to members who have collections may result in offers. They will be gratefully considered, and it would be of special assistance if they could be made at an early date, so that the possibilities of the scheme may be estimated. Professor Roxby offers to give his 300 slides of China if other offers are forthcoming to a sufficient extent to ensure success.

IT is with special pleasure that we offer our congratulations to Professor J. F. Unstead on his new official designation as Professor of Geography in the University of London in respect of the post held by him at the Birkbeck

College. His years of work for this Association give us a special interest in this recognition of the position he has won in the field of geographical study.

A MEMBER of the Geologists' Association asks us to draw the attention of our readers to its work and especially its excursions. Saturday excursions are arranged almost all the year round near London, as well as excursions at Easter, Whitsun, and in August. A recent excursion went to Belgium (see Geog. Teacher, Spring, 1922, p. 213). The Association also issues proceedings and excursion guides, which are sent to members, and its subscription is 10s. per annum. The Hon. Secretary's address is 24, Balham Park Road, London, S.W.12.

THE new Touring Committee of the Association has had a very successful year and has greatly extended its work under the enthusiastic direction of Mr E. E. Lupton, Miss Lee, and Mr Hirst. A full report will be given to the Annual Meetings in January.

TO COLONIAL MEMBERS.—Several complaints have been received of extra postal charges having been claimed on magazines. Will members please return to the Clerk the envelopes on which surcharges are made, so that the matter may be taken up with the postal authorities here?

Will members please note that the first of our Historico Geographical Monographs, "The Wealden Iron Industry," by Miss M. C. Delany, went out of print within six months of issue.

ARRANGEMENTS are being made for a Summer School in Geography in 1923 at University College of Wales, Aberystwyth, under the direction of Professor Fleure. Members who send a stamped, addressed, foolscap envelope to the Clerk, Geographical Association, Marine Terrace, Aberystwyth, will receive further particulars at an early date.

GILCHRIST STUDENTSHIP.—The Gilchrist Trustees again offer for 1923-4 a studentship in Geography, value £80, which may be increased somewhat, but not so as to exceed £120. It is tenable at any recognised School of Geography. Applicants, who should be teachers with at least two years' experience, should send in their names to Professor L. W. Lyde, University College, Gower Street, London, W.C.1, before the end of January, 1923. They should send references, a full account of their previous work, and three testimonials.

THE Editor expresses regret for an error allowed to pass in a review of Messrs Bacon's Map of Europe published in the last number of the "Geographical Teacher." The Aland Islands are under the sovereignty of Finland and not of Sweden, as stated in the review. Our regrets are offered to all concerned.

THE Editor is indebted to the generosity of a member of the Association for help towards the cost of publication of the additional illustrations in this number.

The Natural Regions of Spain.

An abstract specially prepared from
" *Regiones Naturales de España* " by *J. Dantin Cereceda.*
[2 vols. Madrid, 1922].

Professor Cereceda's book is at once a plea for the value of the regional method of study and an application of that method to the detailed study of the geography of Spain. The word " region " is, in another connection, already familiar in a country where regional consciousness, *regionalismo,* plays so large a part in interior politics. The peasantry of Spain have, moreover, long identified many natural regions (*Tierra del Pan,* in Castile) and regional types (*Las Mariñas,* Galicia), and have given them homely and expressive names which have become traditional. In this preliminary study Professor Cereceda has gathered up such data as are available for these traditional regions and has shewn their relation to the seventeen major regions into which, from the scientific standpoint, the country may be divided. We are permitted to print an abstract of this work by the kindness of the author and of the *Museo Pedagógico Nacional,* a society not the least of whose labours in modernizing Spanish educational methods has been the publication of this study. The abstract is divided into :—

(1) An introduction dealing with Spain in general under appropriate headings.
(2) A more detailed account of each of the major regions.
(3) Map, with brief notes on the traditional regions included in each.

It should be explained that the first, or introductory, part of this summary is intended merely as a supplement to (a) the reader's general knowledge and (b) to the detailed regional accounts. Matter presumably familiar or elsewhere treated is excluded for the sake of brevity. The sections on Fauna and Anthropometry are entirely omitted. The word " paramo " has been retained in translation throughout to denote ground which is flat and bare, and usually, if not always, at plateau level.

INTRODUCTION.—I. Relief.

Study of the relief shows that the Peninsula is pre-eminently a land of mountain and meseta. Great plains or depressions are few (tectonic fosse of the Ebro, depression of the Guadalquivir, Portuguese mesozoic fringe). The mesetas show everywhere traces of a considerable recent elevation ; they are now exposed to fresh torrential erosion. The Pontian limestones which form their upper flat surfaces reach in both the Castiles to heights of 980 m. to 1,000 m.

The population is seldom found settled on the high flat ground, but is distributed rather along the valleys at an altitude of, approximately, 750 m., i.e., below the level of the water-bearing strata at the contact between the limestone of the paramos and the underlying clay.

The great natural regions (the Castiles, Galicia, Ebro and Guadalquivir depressions) are marked by a general uniformity of geological strata. The resulting similarity of the physical and economic conditions explains the constant character of the distribution of the population throughout these regions.

In those other cases where a rich diversity in the outcropping strata might have led to extreme variety in the distribution and types of the social groups (Iberian and Penibetican systems, etc.), we find the tendency to variety neutralised by factors of another order (extreme temperature, scanty rainfall, aridity) tending towards uniformity and making a unit of the area.

The high table-lands of Valencia and Teruel form an interesting case of conditions unfavourable to man from the three points of view of altitude, geological structure, and lithological character of the strata.

The variegated sandstones of the Trias are highly siliceous, porous, and poor in substance; these qualities are aggravated by the elevated position, the low temperatures, and the scanty rainfall. Thus the country, cold, desolate and poor, is very slightly populated, human life is rude and miserable, and the patches of Trias are associated with maxima of criminality.

II. Climate.

The fundamental climatic distinction is between (1) the Spain of the north and west with moderate variation of temperature and persistent rains, and (2) the rest of the peninsula, continental and extreme in climate, dry and arid. The dividing line, first drawn by Brunhes, will be seen in the map accompanying this article.

(Explanatory Note).—1. Rainy portion (annual precipitations from 600 mm. to 2000 mm).
2. Arid portion (id. below 600 mm).

The respective areas of these portions are :—

	Spain only.		%	Whole Peninsula	
Rainy ...	178,259	Km²	= 36·2	261,460	Km²
Arid ...	314,084	Km²	= 63·8	319,523	Km²
	492,343			580,983	

The arid portion may be sub-divided into :—

Rainfall	600—500 mm.	66,402	Km²
,,	500—400 mm.	180,259	,,
,,	under 400 mm.	67,423	,,
		314,084	

The minimum rainfall of the Arid regions is, of course, in summer; the maxima are in spring and autumn. It is interesting to note that the transition from the spring maximum to the summer minimum is slow and gradual, while the transition from the summer minimum to the autumn maximum is rapid and abrupt, a period of violent rains following hard on a time of extreme drought.

EVAPORATION TABLE.

Place.		Mean Annual Rainfall (mm)	Mean Annual Evaporation	Co-efficient E/R
Santiago de Galicia	Rainy portion	1,658·6	912·5	0·55
Palencia (Northern Castile)	Dry portion	296·	1,186·	4·00
Madrid (Southern Castile)	id.	422·	1,500·	3·55
Guadalajara (id)	id.	405·	1,582·	3·9
Murcia	id.	386·	2,048·	5·3

In summer the co-efficient of evaporation is, of course, much higher. Thus a 15-years mean of August figures for Guadalajara gives—

R (mm)	E (mm)	E/R
10·03	263·4	26.24

Human Aspect.—Rain is the most decisive factor influencing the distribution of population in the Peninsula, hence the importance from the human standpoint of the line which separates the rainy portion of the Peninsula from the dry.

The dry, arid portion, of essentially Mediterranean cultures (vine, olive, cereals, drought-resisting leguminous plants) is the land of the large holding (plains) and of the medium-sized holding (paramos and meseta). The population is concentrated in large centres, which nevertheless preserve their rural and agricultural character; the land is kept in the hands of a small number of proprietors. An entire social régime results; the large class of labourers work according to the season, gathering the olive and preparing olive-oil (winter), weeding the ground (spring), reaping and storing the corn (summer), harvesting the vine and sowing the seed (autumn).

Another factor intervenes in many of the dry or steppe zones—Irrigation. In the heart of arid Spain, and even of the Spain of the steppe (Aranjuez, Alcalá de Henares, Eastern Littoral Plain, Aragonese depression), where precipitation comes within the limits of 200 mm. and 500 mm., reservoirs have been established (Valencia, Murcia) or canals dug (Aragon) for irrigation. The coexistence of drought and irrigation in the east and south-east of Spain appears to us, in its influence on the concentration of the population, as the most interesting and decisive phenomenon. The slightest current, the smallest accumulation of water in these regions of sub-desert aridity increases and concentrates the population, leads to socialization of the possession and equalization of the use of the water, extends riches and well-being, exalts the sentiment of liberty, and feeling for the arts (Almeria, Murcia, Valencia, and in fact the whole Eastern Littoral Plain from Sagunto to Denia). In the heart of the arid regions " the venerated liquid " is, par excellence, the governing motive of social and economic phenomena.

In the rainy portion the population is both abundant and dispersed. On the Cantabrian belt the population figures give 1½ hectares per person, or 65 persons per Km². The land is correspondingly divided and sub-divided, and the small-holder is frequently proprietor.

III. SOILS.

An examination of the distribution of soils in the peninsula shows that in the north and north-west—in the portion, that is, where the climate is mild and rains are copious—clayey humus-bearing soils prevail, particularly rich in superficial covering ; we see again, therefore, the importance of the dividing line between this portion and the arid portion.

The study of the soils of the arid portion, which is the larger, suggests some general considerations. The most outstanding of these is that, as in all warm countries, the disappearance of the forest (which, if it existed, must have had a Mediterranean character) has led to the burning up of the superficial covering and peroxidization of the iron, with consequent bright red colouring. Thus originate the Mediterranean Red Earths, which are easily the most widespread of the soils of this portion.

At the same time, deficient in clay and poor in superficial covering as the arid soils exposed to a dry climate may be, this scanty covering is, nevertheless, richer in nitrogen than the carbonaceous humus of the rainy districts, the oxidization of the carbon proceeding much more actively under the temperatures of the dry districts. For the same reason, moreover, we may suspect that highly argillaceous soils, wherever we find them in the dry portion of Spain, originated under earlier climatic conditions of much greater humidity than now prevails.

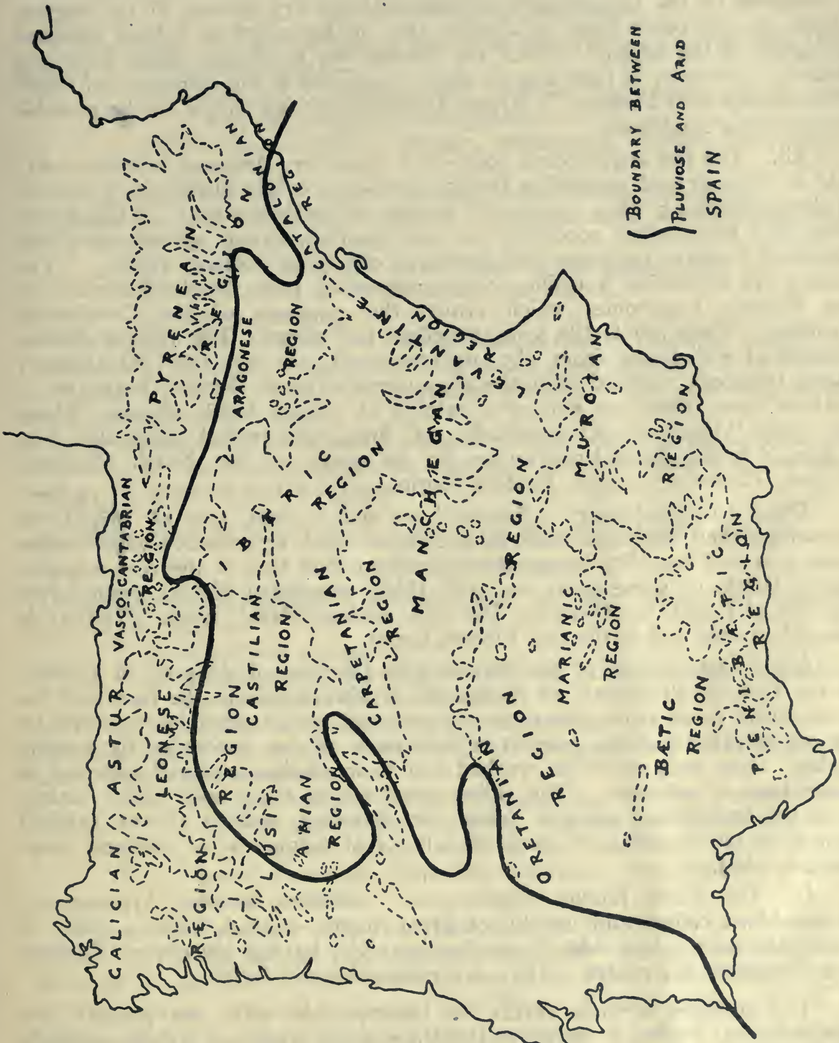
The soils of the arid portion of the peninsula fall into three main classes :—

(A) The Mediterranean Red Earths.
(B) The Black Earths, and
(C) Recent Alluvia.

Of these, the Mediterranean Red Earths, always arid semi-steppe, or even steppe soils, are the most widely spread.

Under this head we distinguish three varieties :—

- (i.) Sandy Soils.
- (ii.) Red Argillaceous Soils, and
- (iii.) Saline Steppe Soils.



A Map of Spain, 1 :7,500,000 or 1 inch=118⅓ miles.

The broken lines indicate the 3,000 foot contour. The map gives the names of the regions discussed in the work thus far issued and the names which it is understood will be used in later parts. The map is, therefore, provisional, and is in no sense taken from the book.

Ai. The sandy soils result from the alteration—rather mechanical than chemical—either of siliceous sandstones or of ancient eruptive rocks and crystalline strata. (Meseta soils—the products of granite or gneiss—forming a quaternary covering on either side of the Central Dividing System).

One may ask why soils originating in the alteration of the rocks (gneiss, crystalline slates, granites) of the Central Sierras (Guadarrama, Gredos) are, speaking generally, not argillaceous, but sandy. The answer is that sands are the more usual product of mechanical alteration, and that this alteration is favoured by the temperature extremes of the dry climate of the region. Argile, on the other hand, is always the final product of a long chemical alteration of the felspars, which the present dry conditions make slow and difficult. So slow, in fact, and so slight in amount is the formation of argile in these soils that the sand is largely felspathic, which would not be possible under humid conditions.

Aii. The red argillaceous soils—not, however, deficient in silica—very arid in summer and crumbling freely, have their origin always in a process of decalcification ; they are true " limons de décalcification." We divide them into two classes according to their position, either spread over the Castilian Tertiary paramos (red clays) or overlying ancient alluvia. The former are crumbling vermilion clays proceeding from the decalcification of the Pontian limestones which crown the paramos of the Continental Neogene. They are fertile soils, excellent for wheat. The ancient alluvia, situated at a distance from the water-courses, are very arid (Quaternary valley terraces), covered with the characteristic scrub (broom, heath, etc.). Besides these, there are extensive patches of ancient fertile alluvia. These are red " limons," clayey-sandy, of fine, well-graded elements, true " lehm," in the diluvial quaternary (in the north of the North Castilian Region, Tierras de Barros, Eastern Region).

These true quaternary " limons " are rich in iron, and of bright red colouring, their decomposition in a climate—past or present—with rather more rain and humidity being more advanced than that of the rose-coloured soils While in some parts an arid, thinly populated district results (the Paramo of León), in others we find rich, well-populated tracts (Tierra de Barros) or cool and fertile (La Ribera, León).

Aiii. The salinity of the Steppe soils (steppes of Aragon, of Castile, of the Eastern Provinces, of Andalusia) is always due to the fact that the evaporation is so strong that the accumulated salts cannot be removed by the slight rains ; if the present régime were to be succeeded by a rainy régime, these soils would be washed and their alkaline material removed in suspension or solution. The saline character of these soils arises mainly from the presence of nitrates (nitre or saltpetre, sodium nitrate, calcium nitrate of La Mancha), of common salt, or of sulphates (of calcium, magnesium, etc.).

B. The Black Earths—argillaceous, tenacious, graded, hygroscopic, of dull-black colour and usually of great depth—extend over a part of Andalusia on the left side of the Guadalquivir, having Marchena, Paradas and El Arahal for centre. They are extraordinarily fertile.

The presence of these earths is incompatible with the present dry climatological régime ; they are therefore dumb witnesses to the existence of a rainier, damper climate preceding the present one. This kind of soil was very common, even on the Meseta itself, under the earlier climate : under the influence of the present dry climate these soils degenerate into the red Mediterranean soil or, if salts have accumulated in them, into the Steppe soil.

C. The Recent Alluvia stretch along the river courses: sandy soils, lacking in cohesion on account of their origin and age, they have sufficient argillaceous binding material to give them a moderate consistency. Rich in organic materials, at times reaching considerable depth, they are ordinarily humid, or at least cool, soils from their nearness to running water. They give excellent land for cultivation. When they occupy the broad valley-bottoms of arid Spain in the middle or lower courses of the rivers, they are called Vega Lands. Their humidity explains the presence of hygrophile plants (willows, black poplars, etc.).

IV. Vegetation and Cultivation.

Note firstly that the cultivated plants of the arid portion fall into three groups according to origin:—

(a) Essentially Mediterranean: cereals, leguminous plants, trees (vine, fig, almond, pomegranate, olive).
(b) Asiatico-tropical: orange, herbaceous cotton, rice, sugar-cane, etc.
(c) American: agave, pea-nut, kidney-bean, maize, etc.

Secondly, that the three fundamental occupations of Mediterranean man in his natural primitive state are:—

(a) Cultivation of the cereals and leguminous plants.
(b) Cultivation of certain trees and shrubs.
(c) Sheep-pasturing.

Under (a) and (b) note the remote Mediterranean tradition which has received scientific interpretation and the name of dry-farming.

Under (c) note the manifest opposition between farmer and stock-master which persists to this day.

The transhumant herd needs pasture and the right to pass, hence the legislation of the Mesta, unique in Europe, with its privileges to the shepherd at the expense of the farmer.

THE MAJOR NATURAL REGIONS OF PLUVIOSE SPAIN.

I. The Galician Region.

Geological Structure. Archæan and granitic rocks in following order (ascending):—

(a) Glandular gneiss.
(b) Gneiss and Mica-schists (Villalba, Lugo), with intercalated amphibolites and serpentines.
(c) Crystalline slates, of great thickness.

These rocks and the granitic batholites have been pierced by later granitic rocks, especially granulites.

(d) On the eastern borders (transition to the Astur-Leonese region) and on the southern, appears the Palaeozoic series with especial development of the Cambrian (slates of enormous thickness—Ribadeo, Barrois; limestones and upper slates—Vega).

Folding. Two sets of folds:—Huronian (N.E.—S.W.) and Hercynian (N.W.—S.E.), the influence of the Huronian folds being dominant, as is shewn by the general S.W. direction of the rivers Ulla, Lerez, Minho, etc.

Fractures. Various fractures and lines of depressions, N.—S. or N.N.E.—S.S.W. Note especially the depression in which the Monforte-Lugo railway lies, marked by a rosary of tertiary and diluvial deposits (Tierras Llanas of Monforte and of Castro de Rey), and aligned with the Portuguese line of depressions, Regoa-Verin. This depression appears to be the natural boundary between this region and the Astur-Leonese.

The region has not been submerged since Hercynian times. Various alternating + and — movements have affected it, of which the slow submergence of the N.W. (possibly post pliocene) is the most interesting, giving the beautiful Galician Rias by submersion of the lower courses of the river valleys.

CLIMATE. Maritime and very rainy. Mean annual range of temperature, 20 deg. (Orense, 31 deg. maximum La Corunna, 18 deg. minimum). Diurnal range of temperature: very constant throughout the year over the region (La Corunna, 8 deg.). Rainfall: Santiago, 1,676 mm (Jan. max. 199, Aug. min. 52). Oporto, 1,094 (Nov. max. 157, Aug. min. 19).

VEGETATION.—Beech, pine and various species of *Quercus* (esp. *Q. pedunculata,* Ehrh. in dense groves) form the fundamental elements of the forest. Chestnut is not less widely spread. Dogwood, *Cornus sanguinea,* L.), service-tree (Mountain to Alpine zones), maple, lime and holly are common.

The scrub is rich in species. Heaths: *Daboecia polifolia,* Don. (chiefly low districts and wooded ground), *Erica ciliaris,* L., *E. tetralix,* L. (low to sub-alpine), *E. cinerea,* L., *E. vagans,* etc. Furzes: *Ulex europœus,* L., the most frequent, and *U. nanus,* Sm. Genista: *G. tridentata,* L. var. *stenoptera* (low to sub-alpine). Thymeleaceae: *Daphne Mezereum,* L. (to 2000 m.), *D. laurela, D. Cneorum, Th. coridifolia,* Endl., indigenous to Spain, Galicia to Biscay.

TRADITIONAL REGIONS IN THE GALICIAN REGION.

Bergantiños, 795.37 Km², 38 persons per Km², Maritime Pine woods, centre Carballo, dialect markedly special.

Jallas, 191.25 Km², 69 persons per Km².

La Limia, 569.25 Km², 20 persons per Km². Stagnant, unhealthy region south of Orense, having the Antela Lagoon in the eastern portion. Fertile "limons" make it the granary of Galicia (rye, maize, vegetables, fruit, and formerly flax).

El Bollo, 455.62 Km², 52 persons per Km². Province of Orense to east of La Limia.

Las Mariñas. Various coastal districts along the rías. The people are taller, more blonde and graceful than the mountaineers of the interior. Sada (Mariña de Betanzos) a typical centre.

La Ulla. Region of vineyards on the right bank of the Lower Ulla.

El Ribero. Basin of the Avia. Famous for its wines.

Tierras Llanas de Lugo, including TT.LL. de Castro de Rey, Del Oro, etc.

II. ASTUR-LEONESE REGION.

GEOLOGICAL STRUCTURE. Mountainous par excellence. Picos de Europa to Galicia and southwards as far as the upper valley of the Aliste. Rocks mainly primary with the exception of the secondary of the E. Asturian coast, the cretaceous of the tectonic fosse Oviedo-Onis, in Asturias, and the quaternary depressions of the Bierzo (Galicia) and of the upper Tera, in Zamora.

The Palaeozoic formations of the region are arranged in successive arcs, the later formations towards the east. From the Devonian strip (Cabo de Peñas to the Luna) eastwards the carboniferous prevails, including the most important coalfield of Spain.

FOLDING.—The mountains originate from two series of foldings:

(a) Hercynian, a complex series, to which belong the narrow folds of the coal basin and the series of primary bands in W. Asturias.

(b) Pyrenæan post-nummulitic, in the secondary rocks and in the Primarics of the main Cantabrian chain.

As will be seen, the general strike of the country, at first E.W., curves to the south in approaching the Galician massif (Sierra de Rañadoiro).

Three divisions of the region are obvious from a study of the relief.

1. The Brañas, or Alps, a region of lofty summits lost in mist, toilsome passes, deep, narrow valleys, gorges and ravines. "Here is the lonely cabin of the herd of the transhumant merino, here the alpine cow-herd disdained and spurned by the valley maid, here the slow-moving cow of bright red colour calling to the strayed calf through the curling mist at dawn."

2. The country from the Brañas to the Marine Platform, on the north, and to the Quaternary Plain, on the south. Here the steep gradients and abundant rain make erosion rapid. In this broken and differentiated country the nuclei of population are small, numerous and set close together. "Mountain, valley, mine, forest and meadow are the dominant features. The man is miner, woodman, cow-herd, or fisher of trout; the woman mows the meadow, milks the cow, churns the butter."

"The harmony and rhythm of natural phenomena—of the clear-watered river gurgling among mossy stones, and reflecting from its surface the hazel foliage—of the mountain, gentle and gracious in line—of the pearly mist—of the soft, fragrant meadow, perennially green—appear in the folklore, which turns always around mountain, valley and rain, the ultimate directors of human conduct."

3. The Meseta of the littoral. A raised platform, formed of an ancient folded region worn level (hence the local name La Rasa) by the waves of pre-quaternary seas and sculptured since emersion into small, shallow valleys and perfectly rounded forms. The towns (Llanes, Ribadesella, Colunga, Villaviciosa, Gijón, Avilés, Pravia, Luarca, Navia) stand on the summits of these domed salients.

Here is the Asturias of the stories, the Asturias of light, free air, moderation and balance. In the mild, humid, uniform climate Central European vegetation flourishes side by side with the Mediterranean fig and laurel, the Asiatic orange and lemon; the rosy apple-blossom decks the garden walls.

Vegetation.—1. Brañas. Blaeberry, slender Alpine grasses.

2. Main region. Forest of the Northern type. Beech, *roble* (*Quercus robur*), *Quercus pedunculata, Q. Sessiliflora* (preferably on high sites up to the zone of the beech); chestnut, alder, birch (*B. verrucosa,* Ehrh.), lime, plane (*Acer pseudo-platanus,* L.); holly, (*Ilex Aquifolium,* L.); currant, *niso,* service-tree, hawthorn frequently found in association.

The scrub is complex. Heath (*Daboecia, Trica* and *Calluna* (low to subalpine zones); red-berried Arbutus; *Spiræa flabellata,* Bertol; furzes (*Ulex*); *Sarothamnus cantabricus,* Willk.; *Genista tridentata,* L., var. *cantabrica;* ferns; blaeberries (*Vaccinium Myrtillus,* L.; *V. uliginosum.* L).

3. Marine Platform. Walnut, chestnut, oak (Central European); fig and laurel (Mediterranean); orange and lemon (Asiatic); apple-tree.

Traditional Regions in the Astur-Leonese Region.

El Bierzo, 2700 Km², 32 persons per Km². Depression into which open the valleys of Valdueza, Ancares, Boeza. Sheltered; humid and mild climate; combines products of rainy region with Mediterranean cultures. Chestnut (*castaño,* giving name to many villages), cherry, service-tree, walnut, potato, flax, maize; vine, fig, chick-pea, blue vetch. *Rubus Minutiflorus,* Lge., peculiar to the region.

Las Cabreras, 605.25 Km², 15 persons per Km². To S. of El Bierzo. District of high mountain. Valleys formerly famous for their flax.

Maragatería, 470.25 Km², 22 persons per Km². West of Astorga. Broken country. Soil poor. On high road to Galicia, hence the *maragatero,* typically a muleteer carrying fish; with the advent of railways, he settles in Madrid as fish merchant. Affinities with Berber type.

La Ceana, 195.75 Km², 14 persons per Km². In León province.
Babia, 301.5 Km², 13 persons per Km². id.
La Lomba, 11.25 Km², 87 persons per Km². Old Leonese *concejo* (group of parishes under common jurisdiction).
Luna, 234 Km², 28 persons per Km². Upper and Lower Luna valleys.
Gordón, 99 Km², 59 persons per Km². Old Leonese *concejo.*
Las Omañas, 38.25 Km², 86 persons per Km². id.
Valdeburón, 274.5 Km², 8 persons per Km². A valley unit.
Valdeón, 157.75 Km², 7 persons per Km². At foot of Picos de Europa.
Liébana, 355.3 Km², 33 persons per Km². Sheltered basin with both Central European and Mediterranean vegetation. Includes valleys of Valdeprado, Cillorigo, Cereceda, and Valdebaró, each with individual character.

Távara, 443.25 Km², 16 persons per Km², in Zamora province.

Picos de Europa, Brañas. Region of high peaks. The Picos on the east, Brañas between Navia and Nalón. Summer pastures with communities under an elective *alcalde de puerto.* Transhumant merino in the Picos, wintering in Estremadura. Cows in the Brañas (middle of May to middle of October).

Carbajales, in Zamora province. Community of pastures in little-known region.

3. VASCO-CANTABRIAN REGION.

From Peña Labra to Roncesvalles; represents a depression in the mountain chain of the north of the Peninsula. Aitugorri, highest peak, 1,548 m. (Cf. Peña de Cerredo (Astur-Leonese) 2,672 m. and the Galician maximum of 1,800 m.).

GEOLOGICAL STRUCTURE. The region is defined by the limits of the secondary rocks, principally cretaceous, of which it is composed, and which separate it from the Palaeozoic of the Astur-Leonese region on the one hand and from the Neogene of the Castilian and Aragonese regions on the other hand, the latter being a limiting area between the mountain and the region of paramos. In its eastern portion there is an inlier of Palaeozoic rock extending from Tolosa to Roncesvalles.

The component materials were originally laid down in the geosynclinal of which the Ebro valley prolongs the axis, and were folded towards the close of the Eocene, at the period of the orogenic movements to which principally the Pyrenees owe their relief.

The immense predominance of the cretaceous is the salient feature of the region. Leaving aside the area covered by the Wealden Series (Villacarriedos and Cabuérniga), we may say that a cretaceous sea occupied the greater part of the territory from the Barremian (eocretaceous) to the end of the mesozoic, the cretaceous series which results being now the most complete in all the Peninsula and one of the thickest cretaceous series in the world. The nummulitic crops out both on the coast (Santander, San Vicente de la Barquera) and in the south of the region (Sierra de Andía, Sierra de Urbasa), where it prolongs the eocene of the southern border of the Pyrenean. The oligocene is of undoubted lacustrine origin. The numerous and extensive eruptions of ophitic materials, principally in the western Trias (Villacarriedo, Entrambasaguas, Reinosa, etc.) add to the individuality of the region.

Folding. Two sets of folds compete for mastery in the area:

(a) N.W.—S.E. folds, parallel to the Iberian system, i.e., to the N.E. border of the Meseta.

(b) E.W. folds, similar to the Pyrenean.

Of these the former predominate. The structure is complicated by numerous faults. Macpherson recognized three longitudinal faults parallel to the alignment of the Cantabrian cordillera, with steps on the north and south sides corresponding to each other.

Climate. Data lacking, except for maritime stations. These shew a mean annual range of temperature of 20 deg. and mean diurnal range of 7 deg. Average rainfall high: San Sebastian 1,335 mm., Bilbao 1,216 mm. The essential characteristic of the region is the approximate equality of the two annual maxima and minima of rainfall. San Sebastian: maxima, October and spring, 161 mm.; minima, winter, 73 mm. and summer, 78 mm.

The valley is here more isolated than in other parts of Spain and is thus, as nowhere else, the determining element. Aranzadi says that ethnic groups are localized in the upper, middle or lower valleys. Very many valleys form forest or pastoral communities with separate political organization. Density of population, 95 per km².

Vegetation.—Northern Forest type. Oak: *Quercus pedunculata* (chiefly on the low, flat ground, never above 1000 m.); *Q. sessiliflora* (by preference on higher ground, 1000—1500 m. up to the region of the beech); *Q. tozza* (?a dwarf oak). Beech, chestnut, birch, ash (*Fr. excelsior*), white hawthorn (*Cratœgus Oxyacantha*, L.), holly.

Scrub of heath, furzes, etc., in subordination to the forest, similar to that of the previous region. The papilionaceous *Sarothamnus commutatus*, Wk., is peculiar to the region.

Traditional Regions in the Vasco-Cantabrian Region.

Campoó, 495 Km², 26 persons per Km². Six groups (*hermandades*) in the Upper Ebro district. The *Campurrianos* show dual ethnological characteristics and are subject of special study.

Valle de Toranzo, 157.5 Km², 46 persons per Km². Villacarriedo, Santander.

Valle de Pas, 288 Km², 20 persons per Km².

Vilga, 105.75 Km², 39 persons per Km².

Encartaciones, 450 Km², 134 persons per Km². District of Northern Forest and scrub, made up of various valleys, Sommorrostro, Carranza, etc., and *concejos*, Zalla Sopuerta, etc. Maize, potatoes, French beans, N.W. European Fruits. Chacoli (a light red wine).

Valle de Mena, 258.75 Km², 23 persons per Km².

La Losa, 474.75 Km², 14 persons per Km². Villarcayo, Burgos, Mountainous country of narrow valleys and tiny hamlets, grouped for jurisdiction in six *juntas*.

Busturia, 299.25 Km², 82 persons per Km².

Burunda, 83.25 Km², 60 persons per Km². Longitudinal fault valley. (R. Borunda or Araquil). Humid. Beech, oak, hazel, lime and ash abundant. Flax-fields formerly famous.

Araquil, 54 Km², 43 persons per Km², in Navarre.

Various valleys and groups (*alfoces*) omitted.

IV. Pyrenean Region.

From Cabo de Creus to the upper basins of the Bidasoa and Urumea. Bounded on the east (Catalan Region) by the axis of the Fluviá and upper Ter, then by a line through Berga and Solsona to the course of the Segre. Extends to the north as far as the French miocene and alluvial plains, and to the south as far as the junction of the eocene with the oligocene of the

Ebro basin (topographical boundary line between mountain and plain). Three natural divisions: (a) Eastern Pyrenees to the Sierra del Cadi (Puigmal, 2909m.); (b) Central or High Pyrenees, to Pico del Midi d'Ossau, culminating in La Maladetta (Pico de Aneto, 3404 m.); (c) Western or Low Pyrenees to Cabo Higuer.

Geological Structure.—The axis of the cordillera is formed by the oldest rocks, metamorphosed by granitic batholiths and by the Hercynian orogenic movements here of Permian date; the axial zone acquires greatest breadth and importance in the Central Pyrenees. Mesozoic rocks are arranged parallel to this axis and on either side of it.

Broad strips of eocene, broader on the Spanish side than on the French, form the borders of the Cordillera till the Aquitanian plains are reached on the north and the oligocene paramos of the Ebro depression on the south.

Folds and faults (parallel to the general direction of the chain) and ophitic eruptions in the Trias fracture and dislocate the immense Mesozoic deposits; the successive step-faults, which on the south reach the Aragonese depression, give rise to sierras parallel to the main alineation (Montsech, Sierra Guara, Sierra de la Peña, etc.)

The topographical forms and character of the erosion are explained (climatic conditions apart) by the youth of the cordillera, of date between the meso- and neo-palaeogene (included by Suess in the group of posthumous Altaides).

Glaciation. The glaciation of the southern slopes is not yet well studied. The two glaciers of the Maladetta massif, Aneto (Pico de Aneto, 3,404 m.) and Maladetta (Pico de la Maladetta, 3,312 m.) descend to 2,700 m., and are the vestiges of a more extensive local quaternary glaciation of which the hanging valleys of Querigüeña and Malhibierna, the glacial lakes (*livones*), morainic deposits, etc., are evidence.

The rivers cut narrow ravines in the folded and faulted strata (upper courses of the Segre, Noguera-Pallaresa, Noguera-Ribagorzana, Isabena, Esera, Cinca, Ara, Gallego, Aragon etc.). Near the contact of the region with the plains of Aragon man dams the torrents for irrigation, hence the innumerable *pantanos*.

Climate. Meteorological data lacking except for the stations of Pamplona, Jaca, and Huesca. These stations show mean temperatures below 10 deg. from November to April, and over 20 deg. from June to September only. The highest mean is 23 deg. for Huesca in August. Annual range, 33 deg. Diurnal range from 5 deg. to 15 deg. For the higher levels, 2,700 m. may be taken as the lower limit of the Polar zone (Köppen, M.T. below 0 deg.), 2,000 m. as that of the Arctic zone (M.T. 0 deg. to 3 deg.), while the Cold zone (M.T. not exceeding 8 deg.) descends in places not exposed to the sun to as low as 1,000 m.

Leaving aside the high peaks (for which no data are available), the region is much less cloudy than the three previous regions, and the Spanish slope is notably less cloudy than the northern. Huesca shews a mean annual rainfall of 543 mm. The maxima (Sept. 69 mm., May 66 mm.) are nearly equal; the minima (July, Dec., 28 mm.) are equal.

As in the Vasco-Cantabrian region, the valley is the dominating natural unit, self-governing and with community of pastures and of forest exploitation. Transhumancy with the Bardenas Reales (Aragonese region) is noted for the Valle del Roncal.

Vegetation.—Spruce *Abies pectinata*, D.C., in the mountain and subalpine regions; generally in groves; associated with *Pinus montana,* Durai, especially in the Aragonese section; *P. montana* is also found alone or with *P. sylvestris,* L. (Scotch fir), up to 2400 m. Birch (*Betula verrucosa,* Ehrh.) up to the zone of the two pines and dispersed among them. Beech, chestnut and even oak (*Q. sessiliflora,* Salisb., from 1000 to 1500 m. in the north-east of Spain taking the place of the *Q. pedunculata* of north-west Spain). Holly and service-tree (*Sorbus chamœspilus,* Crantz). Honeysuckle (*Lonicera nigra*) in spruce groves. *Sambucus racemosa,* L., in beech and spruce groves. Blaeberry (*Vaccinium Myrtillus,* L.) and *V. uliginosum* Alpine and sub-alpine zones. Crowberry (*Empetrum nigrum,* L.) in the Alpine and sub-alpine zones. *Genista horrida*, D.C. of the mountain and sub-alpine regions. *Rhododendron ferugineum* in Alpine and sub-alpine zones, above 1200 m. *Thymelœa dioica, Th. calycina* peculiar to Spain; *Th. tinctoria,* endl. var. *rivalis. Ramondia pyrenaica* Rich. in rock fissures in woods.

TRADITIONAL REGIONS IN THE PYRENEAN REGION.

Vall d'Arán, 47.01 Km², 13.9 persons per Km². Described elsewhere.

Valle d'Aneu, 427.5 Km², 6 persons per Km². To E. of Vall d'Arán. Upper Noguera Pallaresa.

La Cerdaña, 796.95 Km², 7 persons per Km². Upper Segre. Bounded on east by Sierra Cadí.

A detailed study of a Pyrenean Valley, the Vall d'Aran, is given by the author as a specimen. (Aranese dialect terms given in italics).

LA VALL D' ARAN. Sources of the Garonne. Its highest peaks reach almost to 2,900 m. Pico (*Tuc*) de Mauberme, 2,880 m. The relief is mainly due to glacial erosion, the so-called valley being really a deep depression shaped by glacial and sub-aërial influences rather than a valley, with a central orographic nucleus of some 2,300 m. reinforcing the main line of the Pyrenees. This broad massif occupies more than half of the surface of the valley so-called of Aran, and in this relief is carved out the principal basin of reception of the area, with a general south-westerly direction.

The chain which rises on the southern border of the valley, reaching its maximum in the peak of Biciberri (3,000 m.), owes its present outline to the glacial and subsequent sub-aerial influences (cirques of Saburedo and Colomés, lakes (*estanys*) of glacial origin, lacustrine deposits of Rius, etc). It accentuates the alpine character of the valley.

The natural region of the Vall d'Aran is made up of old topographical features of a now extinct glacier. The quaternary glacier of the Garonne, stretching from the Pyrenees to the Plain of Languedoc, was based on the south-eastern corner (now the cirques of Colomés and Saburedo) of the northern slope of the immense chain which gives the valley its southern boundary. Although the glacier is extinct, its topography survives; the basin of reception of the Garonne is conditioned by it to-day. The component rocks are mainly of Archaean date (gneiss) or primary (Silurian slates of Liat and Montolin), traversed by intrusive granite.

The entire valley is separated by a high barrier from the neighbouring districts, with which it communicates by cols or passes of great height. (Bonaigua or Pollars, 2,050 m., leading to the valley of Aneu; La Picada, 2,460 m., to the valley of Benasque). The natural outlet of the valley, lowest and most practicable, is that to French territory along the river Garonne. With this sole exception, the passes, even those leading to France (La Gireta, 2,635 m.; Urets, 2,545 m.) are closed by snow from October to June.

The climate is the usual high mountain climate, but there is an insufficiency of series of positive data. The outstanding characteristic is the amount and persistence of the snows (winter to mid-spring), a fact which explains the relative frequency of avalanches (*lauets*). The summer (July, August) is short with means of 17 to 18 deg. and large daily range. Mists (in contrast with the southern Pyrenean slope) and rains are frequent. As the valley lies towards the north, and not to the Ebro valley, it is subject to oceanic influences (the dominant winds are N.W. and W.), although the high mountain climate prevails, in virtue of the altitude and topography. For this reason, local winds are frequent. The causes giving rise to the east wind (*autant*) are well-known; from the south blows the *balaguera* or wind from Spain, dry and warm, enervating and desiccating, a true land wind in other words, and fortunately rare. The *torb* which blows with direction varying from N. to W., sometimes cyclonic, accompanies the winter snowstorms on heights and passes.

Vegetation and agriculture, the expressions of the relief and climate, are in well-defined vertical zones. The first, or lower mountain zone, includes the valley-bottoms of the main river and its affluents. The cultures are those of N.W. Europe, made up of cereals, wheat (*hurment*), barley (*uerdi*), buckwheat (*morisco*), and the imported maize (*milloc*); leguminous plants, peas (*cedes*), lentils (*llentilles*), etc.; potatoes (*trues*), and beet-root (*bletes a räbe*).

Harvest-time comes at the end of July or beginning of August, or even occasionally, in the higher districts, as late as the first ten days of September. Potatoes and flax are excellent and characteristic crops.

The country being high, mountainous, and subject to a N.W. European climate, is covered with meadows, where trefoils (*farutja*) and sainfoin (*sanfuenc*) are abundant. Grass is the chief product. The mowing of the grass is the almost exclusive summer occupation of the Aranese. In this zone are found the northern trees, poplar (*clopo*), willow (*salenque*), ash (*hercixo*), birch, alder (*vern*), hazel (*auraner*), elm (*um*), chestnut, walnut, (*escarer*), oak (*casse*), lime, holly (*ereu*), juniper (*genbro*), gooseberry (*pinóo*), and cherry (*cerider*).

The sub-alpine zine is, par excellence, the zone of the forest, made up of spruce (*auet*), pines (*P. sylvestris* and *P. montana*), beech (*hai*), yew; with undergrowth of box (*gauets*) and *Arcototaphilos Uva-ursi* (*orioles*). Timber floated down on the streams.

The Lower Alpine zone is characterized by the fine high mountain pasture, in which are found rare examples of *P. montana*; the Aranese here feed up their stocks of mares, jackasses, and mules, the basis of their commerce.[1] (Pla de Beret, Pumero and Baretges, for example).

The Upper Alpine zone of perpetual snows (2,900 m. to the highest summits, Colomés, Mulleres, Montarto) is characterized by the presence of *Ranunculus Glacialis*.

As in all high mountain districts, the house has special chambers for storage of wood and grass through the long winter. The house is sited in the low parts of the valleys, near running water. It is thatched with rye-straw. As in other districts of the same type, St. John's Day (Summer solstice) is specially celebrated.

Baptismal, marriage and burial customs are peculiar to the area; the family and social organization has been patriarchal from time immemorial (*bessin*, head of the house), and communal in respect of exploitation of forest, pasture and water.

The political organization of the valley—a world apart forming an enclave among differing organizations—is similar to that of the Andorra valleys, a natural region in many respects so similar.

The Aranese language is a dialect derived from the Gascon spoken in the old Comté de Commingues, especially on the lower Aran. R.A.

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[1] *It is calculated that some* 40,000 *head pasture in the season.*

Diplomatic Difficulties Arising out of Geographical Accident.

PART II.

J. D. I. Hughes,
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THE first noteworthy step towards the attainment of the freedom of the seas was the publication by Grotius of his Mare Liberum. The object of the treatise was to demonstrate that the Dutch had the right of navigation to the Indies in spite of Portuguese prohibitions. The chief opponent of Grotius in the matter was our own Selden, who wrote his Mare Clausum in 1618, though it was not published until 1635, when Charles I. ordered it to be given to the world. However the doctrinal controversy may have progressed, in fact during the second half of the eighteenth century navigation on the open sea was becoming free in practice to all nations. Isolated diplomatic claims have nevertheless arisen and filtered down to modern times, which raise the old conflict of opinion.

The most important case of this kind was the case of the Behr'ng Sea ; the parties, Great Britain and the United States. The geographical setting for the argument was simple. The promontory of Alaska in the north-west of the Amer'can Continent projects in a south-westerly direction about five hundred miles into the Pacific ; beyond it the Aleutian archipelago extends still further ; above these is the Behring Sea. In 1821 an Ukase of the Czar purported to reserve to Russian subjects the whole of the whaling and fishery rights in this part of the world. Protests by Great Britain and the United States led to conventions in 1824 and 1825, wherein the Russian claims were abandoned. Note that if the open sea is free to all, then not only navigation but fishery and any other rights of profit or convenience must be conceded to all alike. There must be no staking out of claims. The next stage in the affair was in 1867, when Russia transferred to the United States the territory in respect of which the claims were advanced over the open Behring Sea. These claims, in fact, touched the only element of value in the territory, and the point at issue was whether the United States, having obtained the territory, should have exclusive or only participatory rights in the valuable fur seal fisheries of that locality. Given the doctrine of the open sea, the rights would be participatory only ; given the right to monopolise part of the sea, the rights could be exclusively enjoyed and the transferred territory be used by the United States as the base for highly profitable enterprise. In 1870 the Alaska Commercial Company comes upon the scene. It acquired a territorial interest by becoming a lessee of the United States Government, and developed the seal fishing Similar prospects attracted Canadians to these waters about the same time, and it appears that the methods used by the Canadians in their fishing were wasteful, viz., intercepting the seals and killing them as they passed across the Behring Sea. Nevertheless, any acts done were well beyond the limit of territorial waters from the United States shore. The Alaska Company secured an Act of Congress that no person should kill fur-seal within Alaskan territory or " the waters thereof," without authorisation from the United States. The authorities took a wide view of " the waters thereof," and seized three Canadian vessels some seventy miles from the shore and proceeded against the crews in the District Court of Sitka.

Formally, it may be said that Great Britain intervened, and the United States ordered the release of the vessels and the crews. In reality, it is said that the trials were not conducted in a proper manner; that certain principles of legal procedure, framed to protect an accused from injustice, were not observed; that the jury was composed of dependants of the Alaska Company. It also appears that the crews were harshly treated and only released after the sentences were for the greater part already served. The men were discharged without funds; some died, some begged their way home.

The United States in practice maintained the attitude which they had opposed as against Russia at an earlier date, and further seizures were effected in 1887-9. A new Act of Congress was also passed endorsing the previous claim to exclusive rights in the Behring Sea. Further protests, of course, followed from Great Britain. Finally in 1890 Great Britain declared that further seizures would be met by force. In 1892 a treaty was entered into for arbitration, and it was held by a majority that the United States had no right to protect fur sealing beyond the three mile limit generally agreed upon for territorial waters.

This was a notable vindication of the principle of the Open Sea. The practical result was that the regulation of the fisheries could not be effected by an act of sovereignty on the part of the United States alone, but only by treaties in which the concurrence of Great Britain was obtained. Damages were also awarded to Great Britain for the seizures effected, and finally it may be noted that in 1911 more effective regulations were framed and agreed to in the Convention of Washington.

Even when the general principle is established, however, there are residuary problems which are not without interest to geographers. How are you to distinguish the free and open sea from waters which are admittedly territorial and subject to the jurisdiction of the contiguous State?

Where there are no coast configuration difficulties, it may be said that in general the three mile limit still obtains as the official practice, though claims are advanced by some Governments in excess of this. The limit was adopted at a time when three miles was all that could be effectively dominated by shore guns, but although this ground for the rule has now ceased to be in accordance with fact, the rule itself continues in force.

An example of the difficulty introduced by peculiar coast configuration may be seen in the case of the Direct United States Cable Company, Ltd., v. the Anglo American Telegraph Company, Ltd. The trouble arose in Conception Bay, on the east coast of Newfoundland. The bay has a well marked configuration, the entrance from promontory to promontory being more than twenty miles wide. The distances from each promontory to the head of the bay are respectively forty and fifty miles. The average width of the bay is 15 miles.

The facts were that the Newfoundland Legislature granted an exclusive right to the Anglo American Company with regard to the laying of cables "in any part of its territory." The rival company laid a cable on to a buoy in the bay more than three miles from the shore, but more than thirty miles within the bay. At no point did they lay a cable within three miles of the shore.

Clearly Newfoundland had a right to grant any rights within its territorial jurisdiction, and the question was—could the waters of the bay be considered territorial even more than three miles from the Newfoundland shore? Was there anything peculiar in the case to distinguish it from the Behring Sea trouble, when Great Britain vindicated the principle of the open sea? It will be conceded by common sense that where a well-defined bay encloses the sea, there is a case for considering the area enclosed to be territorial waters, even though a strict application of the three mile limit would throw open the heart of the bay to all nations alike. The Privy Council in adjudicating upon the facts above found in fact that the bay was part of Newfoundland, so that exclusive cable rights could be validly granted over the bay, and the rival company were infringing these rights even though they never laid a cable within the three mile limit. The judgment recognised that the practice of nations allowed a bay to be part of a nation's territory, although there was no general agreement as to the conditions under which this might be the case. For instance, some would say that the entrance should not be more than six miles, while others would allow a much greater latitude. Perhaps the safest test would be whether the claim is fair in common sense, having regard to the general proportions of the bay. The case did not assist us on these disputed points, since the fact that other nations had acquiesced in the exercise of British dominion over the bay was sufficient ground to allow a prescriptive claim on the special circumstances of the case.

Comparison may be made with the Moray Firth case, which raised the question nearer home, again in a fishery dispute. We may take the Moray Firth for this purpose to be the waters of the east coast of Scotland inside a line drawn from Duncansby head in Caithness to Rattray point in Aberdeenshire, i.e., a bay with a mouth roughly eighty miles in width.

Under the Herring Fishery (Scotland) Act, 1889, beam and other trawling was prohibited in these waters. In 1905 one Mortensen, a Danish subject, captain of a Norwegian vessel, was prosecuted in the Sheriff Court at Dornoch for an offence under this Act. He was fined, although he pleaded that his acts were done beyond the three mile limit. On appeal, the High Court of Justiciary were unable to listen to the diplomatic argument, since they were bound by the Statute which, rightly or wrongly, declared these acts an offence within the waters of the Moray Firth. Upon diplomatic representations being made by Mortensen's Government, Great Britain conceded the principle that the three mile limit determined the question as to how far acts of sovereignty could be exercised over the sea. Beyond that limit the principle of the freedom of the open sea should obtain.

Mortensen's fine was remitted, and the matter was rectified by the Trawling in Prohibitive Areas Prevention Act in 1909, which directed that no prosecution was to take place for acts done beyond the three mile limit. Fish caught, however, by the forbidden methods were not to be landed and sold within the United Kingdom.

A glance at the map will indicate the difference in the coastal outline which led to the decision in each of the last two cases. Other claims are made for other bays, that the waters they comprise are territorial. Great Britain, for instance, claims the Hudson Bay, which has an area of 580,000 square miles, and an entrance fifty miles in width. The presence of American whalers there may raise a similar question to that of the Behring Sea case. The United States claims Chesapeake Bay, entrance twelve miles wide ; Delaware Bay, entrance eighteen miles ; Cape Cod Bay, entrance thirty-two miles. France claims the Bay of Cancale, entrance seventeen miles, and Norway the Varanger Fiord, entrance thirty two miles. All these are bays of well-marked configuration, and the claims are easily distinguishable from, e.g., the old British claim to the King's Chambers.

Inland seas have raised similar difficulties to those outlined above. The trouble arises where there is an outlet to the open sea. The Black Sea, for example, has been regulated by a long series of treaties, but these rather reflect current political situations than any clear principle.

Finally, the question of the Sound Dues may be referred to. It arose in connection with the waters of The Great Belt, The Little Belt, and the Sound, connecting the Kattegat with the Baltic, dividing Denmark from Sweden. Denmark claimed sovereignty over these waters, and the claim resulted in the collection of dues from traffic to the Baltic, and the delays consequent thereon. This ancient right was challenged when the doctrine of the open sea became established, and the United States was especially emphatic in the matter.

A general settlement was finally effected by the Treaty of Copenhagen in 1857, when Denmark surrendered her claim for £3,000,000, and the principle was established that straits connecting parts of the open sea should themselves be open. The United States made a separate treaty on the matter, since she objected to the recognition of the ancient prescriptive right by the general treaty.

The great artificial waterways are, of course, regulated by their own treaties, e.g., the Panama Canal.

Sufficient has been said to illustrate the influence of geographic situations upon international doctrine. At least in the matter of waterway communications it is apparent that on the whole a more liberal outlook has supervened upon narrower conceptions, and that in this not unimportant sphere of international life there has been genuine progress.

Evolution of the Essex Rivers and the Lower Thames.

J. W. GREGORY, F.R.S. Benham and Co., Colchester. 1922. 68 pp., 10 illustrations, 22 x 14 cm. 2/6.

Professor Gregory tells us in this book that be began to read geology in the hope of finding some interpretation of the apparently anomalous behaviour of Essex rivers which so often make right angled bends instead of flowing straight on to the sea. He was thus led on to the papers of S. V. Wood (1864-1886) and to field work among the charms of rural Essex with its green enriched by the glint of blue where the estuary flows, for the Essex shore is the most irregular in England according to our author, with rias (submerged river mouths) in series right along. Some of the inlets have lost their rivers, and extinct rivers may be traced at times by their gravels often forming hill-top caps. Essex is such a mature, thoroughly denuded county that the present-day physical geography offers no explanation of the curious river courses and the riverless inlets, and the present rivers must be the descendants of older ones, which it is the business of science to trace.

The book gives an account of the geology of Essex, including information, from borings, as to the deep-seated foundation of ancient rock buried 500 feet deep in the N.W. and over 1,000 feet in the S.E. Over this are cretaceous and Eocene deposits, and Gregory ascribes mucn of the present relief of Essex to river action in the long period between Eocene and Glacial times. The glacial geology of Essex is discussed in some detail, and the chalky boulder clay has been found to contain not only the minute fossils abundant in chalk, but related forms known from the seas of the Ice Age as well, i.e., the possibility that this boulder clay was laid down under water is not to be excluded, indeed this is highly probable. If so, the fact that the bottom level of boulder clay is now sloping goes to show that either N.W. Essex has risen or S.E. Essex has sunk, or both, since the Ice Age. Gregory agrees with Reginald Smith, Layard, Reid Moir, Boswell, and Slater that the glacial deposits belong to two distinct periods, the chalky boulder clay being in his view of Mousterian date, that is probably contemporary with the Würm Ice Phase in Penck's scheme as interpreted by Peake and others ("Man," 1922). He accepts the view that the mammoth had disappeared from England before the time of this Chalky Boulder Clay.

From evidence of the materials in the gravels, Gregory supposes that the first river scheme was one in which a stream flowed across from the S.W. corner of the county to the region of the Chelmer mouth, and received feeders from N.W. and S.E.; this would be in late Eocene times. At the time of the Wealden uplift there would have been an E—W depression across mid Essex, with a stream, of which fragments survive in the upper courses of Ouse and Lea and the lower end of the Chelmer. Then would have come the great depression (E—W) occupied now by the lower Thames, and this drew several streams soutnward for a while or until this dav. This is a very bare excerpt from an interesting argument, and the paper ends with a good bibliography. This is a little book that will help many a student in observing river phenomena in his own locality, while it is open to everyone to help several sciences forward by developing study of glacial deposits on the lines discussed here from the work of well-known students.

The Industrial Centres of the Pacific Coast of North America.

By H. M. Spink, M.C., M.A., B.Sc.

THE many readers of the remarkable book, " Le declin d'Europe," by M. Albert Demangeon, Professor of Geography at the Sorbonne, will be quite prepared to receive the idea that economic supremacy is passing from Europe to the N. American Continent. But perhaps few people are really alive to the very great possibility of an industrial shifting within the American Continent itself. Yet it appears to be one of the great possibilities of the future that in the Western States of North America will arise an industrial region, possessing many natural advantages over the industrial regions of the East, which will seriously compete with the present established industrial areas. The purpose of this article is to discuss briefly what are the natural geographical advantages possessed by the regions of the Pacific slope of North America, and where are the new and rising industrial centres.

A few years ago, merely a matter of one generation, the possibilities of the Pacific States were unnoted. It needed an energetic policy of transcontinental railway building, mainly [1]political in its conception, and a complete change of national political outlook which dated from 1898, to awaken an interest in, and to give a new significance to, the western coasts of N. America. The possession of a colony—the Philippines—in Asia, the increasing importance in commerce of Eastern Asia, the rise of Japan after the wars with China and Russia 1895-1905, the disintegration of China, the ' immigration of Asiatics ' question, all helped to concentrate attention on the development of the Pacific States. This destroyed once and for all the natural isolation of these regions. The barrier of the Rockies has been pierced by numerous transcontinental railroads, each interested in the development of a terminal port, whose growth has been [2]artificially helped by discriminatory railroad rates. This artificial stimulus has been backed by the inflow of settlers of suitable type. The atlas of Canada shows that immigration to British Colombia is 80 per cent. British, while returns for Washington, Oregon, [3]and California show an overwhelming proportion of settlers from N. and N.W. Europe.

If the climatic records are studied it will be seen that along the Pacific seaboard the climate, while invigorating enough to promote energy in the highest degree, is yet not so severe as to produce a " slowing down " of human initiative. It conforms agreeably to Huntington's proposition of a climate which supports the highest form of civilization and the most efficient population. (See " Climate and Civilization.") It is indeed claimed by several of the Pacific cities that the favourable nature of the climatic conditions means a 20 per cent. added efficiency over Eastern American conditions. The most favourable portion of the coast undoubtedly lies between Vancouver and Los Angeles, but mild weather and favourable conditions exist much further north. Comparative temperatures are interesting. (Mean Fahrenheit).

	Jan.	July.	Record High.	Record Low.
Washington D.C. ...	33	77	104	—14
Atlanta (Georgia) ...	42	78	100	—08
Detroit	24	72	101	—24
San Francisco ...	50	57	101	29
Seattle	39	64	96	11

[4]" It is the charmed land of the American Continent, where a temperate sun, a mild climate, and a fertile soil give man the stimulus of the green and rain-swept north with the luxurious returns for moderate effort of the teeming tropics ; . . . the ideal home for the blonde race upon this American Continent."

The Pacific coast region, moreover, is singularly fortunate in its wealth of power resources. The wells of Southern California [5]produce 120,000,000 barrels of petroleum yearly, and there are great possibilities of further oilfield discoveries at many points, [6]notably around Katalla in Alaska, and in the lower Mackenzie Valley.

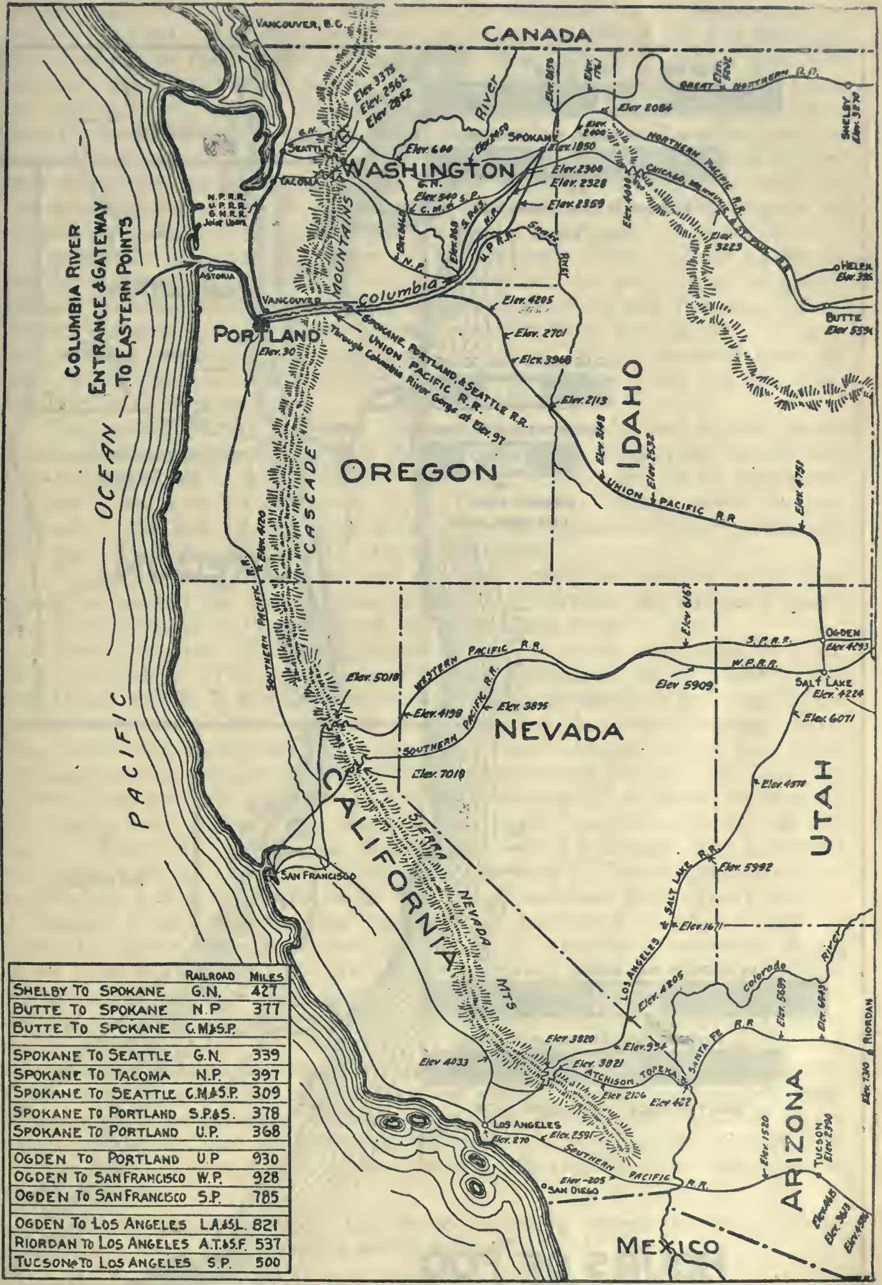
There is a remarkable ignorance of the great coal resources of the Pacific coast. It is not widely known that in Alaska there are anthracite fields exceeding in magnitude those of Pennsylvania, and that there are areas of good bituminous coals of even greater extent in the same State. Both British Columbia and Yukon contain large stores of good coal ; the deposits along the Skeena River—the Telkwa fields and others—are especially important. South of Washington, however, coal is hardly found at all, and undoubtedly the most convenient points for the utilisation of coal in industry are Prince Rupert, Seattle, Tacoma, or Vancouver. It is largely the presence of cheap petroleum which has prevented the serious exploitation of coalfields in Washington and British Columbia. In Alaska, coal areas have not been released for working until a year or two ago.

But in all probability it is on hydro-electric power that the Pacific industries will in future be largely based. Even to-day in cities like Portland and Spokane electricity is predominant as motive power. The Pacific States, possessing a high rainfall, a glaciated surface with many lakes which act as natural reservoirs for regulating stream flow, and streams with rapid courses and many falls, have at their command most important water powers At a conservative estimate British Columbia possesses 3,000,000 h.p. easily available. [7]Washington possesses a minimum h.p. of 4,932,000—a maximum of 8,647,000. Oregon possesses a minimum h.p. of 3,148,000—a maximum of 6,613,000. California possesses a minimum h.p. of 3.424,000—a maximum of 7,818,000. The last three States possess 42.8 per cent. of the maximum water power available in the United States. Clearly, therefore, as regards power the Pacific coast is abundantly favoured.

It is favoured also in its soil and its agricultural products. From Puget Sound and the Fraser Valley there extends southwards a great series of inter-montane valleys of singular fertility. These are in order southwards the Cowlitz Valley, the Willamette Valley (with the great Columbia Valley), the Sacramento-San Joaquin Valley, and lastly the Imperial Valley. Here were the great farms where grain once was the predominant crop. But a double tendency is at work everywhere. First there is a constant decrease in the size of farms, with an attendant rise in the value of the land. Second there is an increasing attempt at adaptation of crop to soil and climatic conditions, involving a great variation in crops. Nowhere else perhaps are there so many different agricultural products in so small an area, ranging from oats, wheat, and barley to cotton, figs, and pine apples.

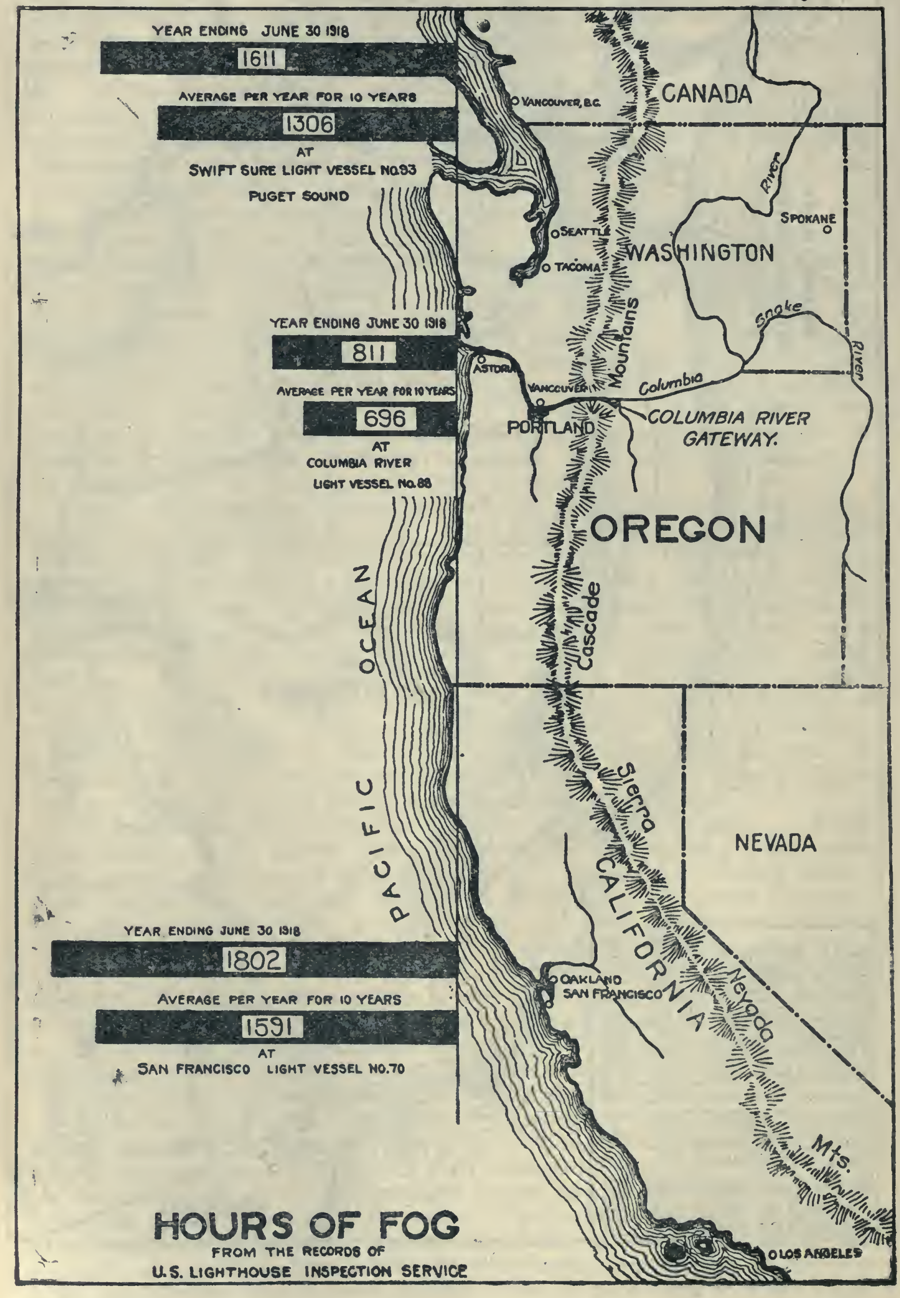
Of forest wealth, especially in the three northern States, where rainfall is especially heavy on the coast, it is sufficint to note [8]that more than 50 per cent. of the merchantable timber of the continent is here.

Now this brief survey of resources is sufficient to show that there is a solid basis for an industrial development of importance, and such a development would naturally arise in course of time, but it has been noted above that a number of conditions have stimulated that development greatly in advance of its normal rate. The curious agglomeration of population in a few large urban centres which is so typical of new countries (c.p., Sydney and Melbourne in Ausralia), and which is very typical of the Pacific coast, favours a



	RAILROAD	MILES
SHELBY TO SPOKANE	G.N.	427
BUTTE TO SPOKANE	N.P	377
BUTTE TO SPOKANE	C.M.&S.P.	
SPOKANE TO SEATTLE	G.N.	339
SPOKANE TO TACOMA	N.P.	397
SPOKANE TO SEATTLE	C.M.&S.P.	309
SPOKANE TO PORTLAND	S.P.&S.	378
SPOKANE TO PORTLAND	U.P.	368
OGDEN TO PORTLAND	U.P	930
OGDEN TO SAN FRANCISCO	W.P.	928
OGDEN TO SAN FRANCISCO	S.P.	785
OGDEN TO LOS ANGELES	L.A.&S.L.	821
RIORDAN TO LOS ANGELES	A.T.&S.F.	537
TUCSON TO LOS ANGELES	S.P.	500

2


YEAR ENDING JUNE 30 1918
1611
AVERAGE PER YEAR FOR 10 YEARS
1306
AT
SWIFT SURE LIGHT VESSEL NO.93
PUGET SOUND
YEAR ENDING JUNE 30 1918
811
AVERAGE PER YEAR FOR 10 YEARS
696
AT
COLUMBIA RIVER
LIGHT VESSEL NO.88
YEAR ENDING JUNE 30 1918
1802
AVERAGE PER YEAR FOR 10 YEARS
1591
AT
SAN FRANCISCO LIGHT VESSEL NO.70
HOURS OF FOG
FROM THE RECORDS OF
U.S. LIGHTHOUSE INSPECTION SERVICE
CANADA
VANCOUVER, B.C.
River
SPOKANE
SEATTLE
TACOMA
WASHINGTON
Snake
River
Mountains
ASTORIA
VANCOUVER
Columbia
PORTLAND
COLUMBIA RIVER
GATEWAY.
OREGON
Cascade
PACIFIC OCEAN
Sierra
CALIFORNIA
NEVADA
OAKLAND
SAN FRANCISCO
Nevada
Mts.
LOS ANGELES

development of an industrial character, but especially so if there exists an external market. The rise, therefore, of a large market in the Far East and the entrance to the markets of India, the East Indies, Australia and New Zealand, especially during the pre-occupation of Europe in the war, have given an enormous stimulus to industry in the city centres of the Pacific coast. Some proportion indeed of this great commercial gain will not be retained when the European countries seek to regain their lost markets, but a great deal must rank as a permanent commercial gain. Also we must reckon on the development of the S. American Republics, now financially largely independent of Europe, as affording a new outlet for Pacific coast industry.

A factor of uncertain value is the Panama Canal, so far as Pacific industrial development is concerned. It permits the easy export of grain, timber, and fruit to Europe, and thus aids agriculture and forestry, but it admits the serious competition of the industrial, East and South. It may also cause a diversion, not apparent in war-time, of raw material from the East (China, Japan, Straits Settlements) direct to New York and the other Atlantic or Gulf ports.

But perhaps it may be more interesting to consider one or two of the growing industrial centres of the Pacific coast and endeavour to estimate their chances of ultimate industrial leadership. There are to be considered (a) the Vancouver-Victoria area ; (b) The Puget Sound ports, Seattle, Tacoma ; (c) The Golden Gate area with the ports of San Francisco, Oakland, Alameda, Richmond ; (d) Los Angeles.

To discuss the geographical and economic conditions relating to all these would far exceed the scope of this article, and therefore we will very briefly discuss the claims of Puget Sound and the Golden Gate.

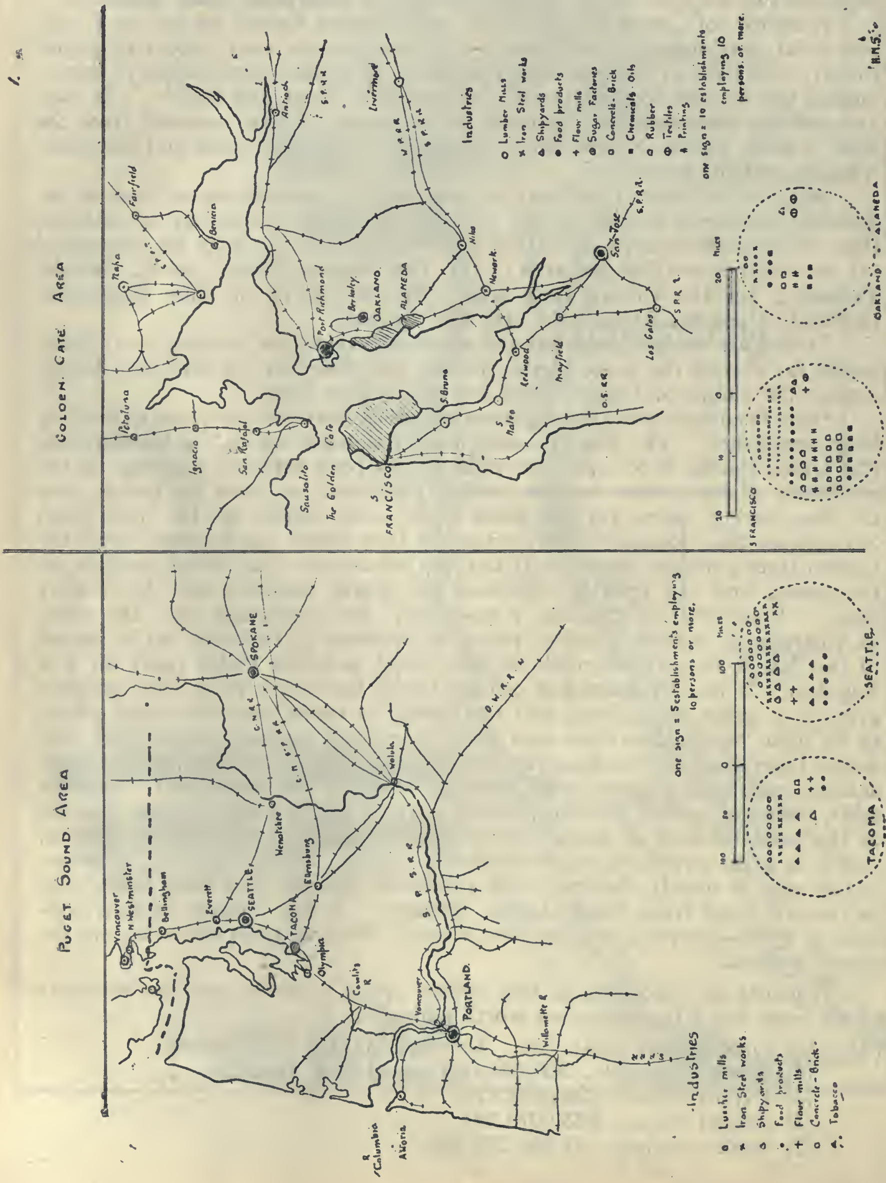
[9]San Francisco and its neighbouring cities have the advantage of being long established. The first transcontinental railroad led to the Golden Gate (the Union Pacific R.R.), and the railroad has been active in building up the prosperity of its western terminal. San Francisco has been for many years the distributing centre for the whole coast and especially for the great Sacramento-San Joaquin valley, which in turn pours its products into the Golden Gate ports for export. It has the advantage of a central location on the coast, and its relative nearness to world markets can be readily seen. Relatively to Seattle, it possesses an advantage for the trade to Australia, S. America, and all points to eastward of Panama, but in regard to this last it has strong rivals in San Diego and San Pedro (port for Los Angeles). It has an enormous coastal trade, for which its central position gives it a great advantage, and this tends to cause new industrial plants to fix upon the Golden Gate area as an operating centre. Iron and steel works (operating on water-carried material) are very numerous. Factories dealing with food products and building materials are prominent. Lumber mills, chemical works, printing, follow next in order, while the war has led to the establishment of rubber works, textile factories for silk and cotton, and to a great extension of the steel-ship yards. Power used in industries in this area is mostly obtained from petroleum (several pipe lines lead direct to the area) and from hydro-electric stations. A vast system of inter-connecting hydro-electric plants supplies power to the area from the valleys of the Sierra Nevada.

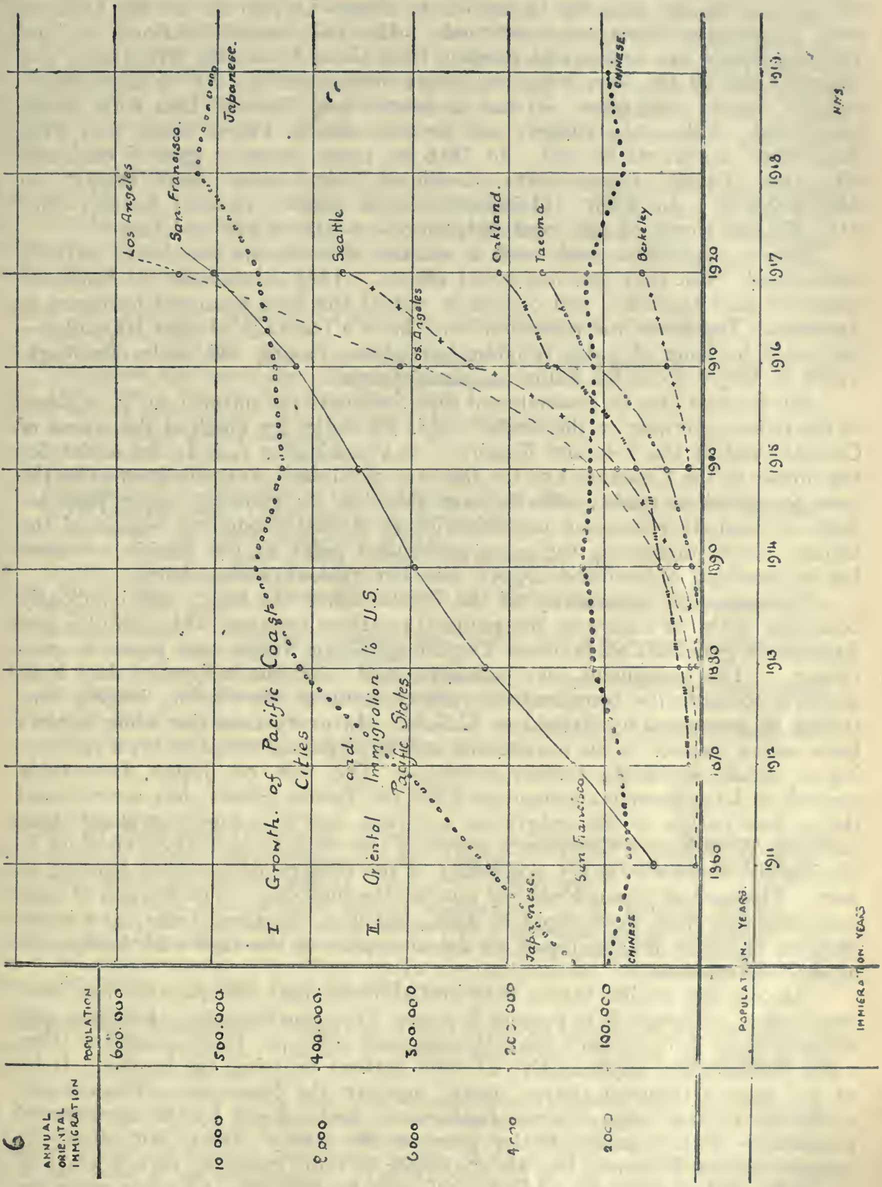
It would be impossible in this limited space to enumerate the activities of the area, but a few items are worth noting[10].

(A). (1) Fishing fleet to Alaska. Tonnage, 37,008. 45 vessels.
(2) Lumber receipts, 800,000,000 board feet annually.
(3) Export values, $235,665,879.
(4) Import values, $238,074,061.
(5) Bank clearings, $7,286,339,430.

(B). Manufacturing statistics :

	Factories.	Persons Employed.	Value of Products.
San Francisco ...	2,334	42,089	$162,300,000
Oakland ...	573	9,699	28,522,000
Alameda ...	52	1,260	2,552,000
Berkeley ...	95	1,724	7,231,044
Seattle ...	1,014	15,761	64,390,000
Tacoma ...	339	8,084	27,708,000




6
ANNUAL ORIENTAL IMMIGRATION
POPULATION
I Growth of Pacific Coast Cities
and
II. Oriental Immigration to U.S. Pacific States.
Los Angeles
San Francisco.
Japanese.
Seattle
Oakland.
Tacoma
Berkeley
Los Angeles
San Francisco
Japanese.
CHINESE
CHINESE.
600.000
500.000
400.000
300.000
200.000
100.000
10 000
8000
6000
4000
2000
1860
1870
1880
1890
1900
1910
1920
1911
1912
1913
1914
1915
1916
1917
1918
1919
POPULATION. YEARS.
IMMIGRATION. YEARS
H.H.S.

The industrial future of the Puget Sound area is much more promising than that of the cities farther south. Its growth is comparatively recent and has been astonishingly rapid. Many factors favour its growth and offer a great future to the whole area. For overseas markets it has a distinct mileage advantage over the Golden Gate cities—i.e., so far as the Chinese and Japanese markets are concerned. Its rail communications to the Eastern States are easier and quicker than those from San Francisco, and therefore during the war, when the great divergence of ' Far East-Mediterranean ' traffic took place, it was to Seattle and Tacoma that such traffic gravitated. Silks, oils, rubber, and tin ore came to Puget Sound and were despatched eastwards by rail. In 1918 its trade turnover greatly exceeded all other Pacific coast ports combined, viz., over $597,000,000 to $495,000,000. In 1918 111,999,608 lbs. of rubber entered Seattle, with $121,275,000 worth of silk, and $64,856,383 worth of oils and fats.

[11]Such conditions and such a volume of trade are not being entirely maintained, [12]but they had important effects. They stimulated the improvements of port facilities, and Seattle is one of the best equipped harbours in America. The inner and outer harbours have a frontage of over 100 miles—the inner harbour of Lake Washington alone having 80 miles frontage. There is ample room for industrial development.

But it must also be remembered that Seattle is the natural outlet of some of the richest territory in the world. It is the outlet for much of the wheat of Canada, and of the " Inland Empire " of Washington ; it is the outlet for the timber of the Cascades and for the ores of Idaho. It is destined to be the base for Alaskan trade, with its vast fisheries, its growing paper pulp industries, and its enormous potentialities as a coal producing region of the future. It is, moreover, the most convenient point on the Pacific seaboard for the smelting of iron and copper, whether by coal or electricity.

The economic prosperity of the Pacific coast has been, and is, closely bound up with the nature of the political relations between white peoples and Asiatics in general and between English-speaking States and Japan in particular. The movement of Japanese and Chinese emigrants has been strongly towards the comparatively empty lands of the Pacific, largely controlled or possessed by Britain or U.S.A. In every case the white settlers have seen a menace in the movement, and have passed effective laws restricting or totally excluding further arrivals. The rise of Japan, favourable enough in its economic consequences for the Pacific States, has accentuated the serious nature of the emigration question, and it is highly probable that until the Washington Conference removed the military and naval rivalries in the Pacific, there was every possibility of the emigration question leading to war. The case of Japan is not, of course, the only one. The growth of race consciousness has been rapid in Asia, and in a measure, India, and many sections in China regard Japan as the champion of the rights of Asiatics as against Europeans.

Among the Pacific States it is in California that the question has been most acute, although it is present in every State northwards. Japanese and Chinese have a free entry into Mexico, and perhaps their numbers there make Californians apprehensive of such settlers crossing the border. It is, at any rate, a frequent charge made against the Japanese. But even in California the agitation against Japanese is made chiefly by the agricultural interests. The Japanese settler goes on the land. He is not willing to become a farm labourer, but always seeks to rent, lease, or own a tract of his own. When these plans fail he will work by contract. Of some crops the Japanese farmer has nearly full control. Thus in 1915 Japanese controlled 88 per cent. of the berry fruit crop, 67 per cent. of sugar beet, 58 per cent. nursery products, 52 per cent. of grapes, 46 per cent. of fresh vegetables, 39 per cent. of citron fruits, and 36 per cent. of deciduous fruits.

The Japanese also had a large control of the fishing and fish-canning industry, but nearly all States are making it increasingly difficult for Asiatics to obtain fishery licences.

The question of State jurisdiction over the entrance of aliens is rather interesting. So far as California, Washington, and Oregon are concerned, the States possess the right to exclude aliens, or at least appear to do so, and certainly to prevent aliens holding land, [14]in spite of any enactments of the Federal Government. The Federal authorities therefore find themselves in considerable difficulty when treating with Japan, because while they stand as responsible to the Japanese Government for the 'exclusion' acts of the various States, they have no real control over legislation such States may think fit to pass.

The commercial and industrial interests on the Pacific coast (apart from Labour) do not view the matter with such alarm. They point to the fact that the Asiatics (at least the Chinese and Japanese) make good settlers, and rather fear that an irreconcileable attitude in the matter will damage trade, as no doubt it will.

[1] See Miss Semple, "American History and its Geographical Conditions," ch. xvii., and esp. p. 395.

[2] See Ripley "Railroad Rates and Regulations," and the numerous reports of the Inter State Commerce Commission, Washington.

[3] "The Times" Supplement, Dec. 31st, 1913.

[4] Dr. Woods Hutchinson "The Conquest of Consumption."

[5] U.S. Geological Survey Reports.

[6] U.S. Geological Survey Report, No. 662.

[7] U.S. Geological Survey Report, 1922, Feb. 25th.

[8] "Geographical Distribution of the Types on the Pacific Coast of N. America," H. M. Spink, Scott. Geog. Magazine, Oct., 1921.

[9] See the graph of relative population growth.

[10] Figures Ann. Stat. Report. S.F. Chamber of Commerce, 1919.

[11] "Seattle, the Seaport of Success."

[12] P. H. W. Ross, "The Western Gate," and "Manufacturing Opportunities in Washington," 1921.

[13] Yamato Ichihashi, "Japanese Immigration," 1915, and also reports published by the Japanese Association of America.

[14] It is argued that Exclusion Laws violate the constitutional principles upon which the Republic was founded, and are therefore not legal.

N.B.—The Japanese Association of San Francisco will supply a budget of pamphlets dealing with all aspects of the situation, if asked.

Map of Europe (south of Stockholm and Petrograd), showing 1921 Boundaries. Messrs Bartholomew. 88 x 58 cm. 1/- on paper, 2/6 cloth, 7/6 cloth varnished and on rollers. Scale 1 : 5,500,000.

This is a careful piece of work without speculations as to possible divisions of Russia, but like all other recent maps, subject to adjustment as regards Greece and Turkey. Messrs Bartholomew offer special terms for direct orders in quantity. The map is full of place-names and railway routes are conspicuous. Physical features are almost suppressed. An inset gives the 1914 boundaries.

Imperial Institute Map of Chief Sources of Metals in the British Empire. 118 x 102 cm. 1922. G. Philip and Son. 5/6 or on cloth with rollers, varnished 12/6.

This sheet includes a world map with supplementary regional maps and diagrams of production for 1918. For each metal the relation of the output from the British Empire to the world output is given diagrammatically. This brings out the wide distribution of gold and the fact that, thanks mainly to South Africa, the Empire produces about two-thirds of the total supply. Canada produces 90 per cent. of the world's nickel, and Malaya produces nearly one-third of the world's tin, while the total Empire production is nearly one-half. The rest of the Empire, apart from Britain, at present produces strikingly little iron. On the maps the regions of production are indicated by conventional marks varied by use of colour.

Palestine.

A lecture to teachers of Scripture and of Geography to suggest co-operation and mutual aid.

AFRICA and Arabia are alike parts of an ancient plateau deeply fractured along certain lines that run north and south in Syria, along the Red Sea and in East Africa. These fractures determine the coast line's direction in Syria, and that coast shows the result of sinking in the harbour inlets north of Carmel and of uplift in the barren, sandy shores south of that feature. But the great fracture is along the top of an arch of the plateau, and between the steep, broken edges a belt of land has sunk deeply. It gets deeper southwards from the Sea of Galilee down the Jordan valley to its deepest point under the Dead Sea, a point nearly 3,900 feet below the Mediterranean. The old plateau west of Jordan is thus somewhat separate from the rest, and naturally slopes to the Great Sea, whereas its eastern edge is so sharp that Bethlehem, only 14 miles from the Dead Sea, stands 3,842 feet above its surface, and therefore more than 6,400 feet above its deepest point. Westward the land slopes down from Bethlehem through 2,550 feet in 34 miles down to the Mediterranean. The neighbourhood of the high place Bethel farther north, is in places 2,900 feet, and the plain of Mamre farther south over 3,300 feet, above the Great Sea.

The high land narrows northward through Samaria, and is flanked on the west by the lower, but still hilly country of the Shephelah. The upstanding edge of the great Arabian block facing Judæa on the east slopes sharply down through 3,900 feet to the " sea of the plain " which is thus appropriately described as being " even under the springs of Pisgah " (Deut. iv., 49). The great fracture is continued in a modified way northward from the Sea of Galilee between Lebanon, 6,070 feet, and snowy Hermon, 9,383 feet, whereabout there descend goodly dews (Psalm cxxxiii., 3).

The north and south lines are the main features in the pattern of the country, but there is another set of lines north-west to south-east. One of these gives the lowland of Megiddo or Esdraelon sinking Jordan-wards through the narrower valley of Jezreel. On the south-western flank of this line stand out the hills from Gilboa to Carmel, and on its north-eastern side the land rises to Nazareth and Tabor. This little gap is the highway of commerce and war, and has become proverbial under the name of Armageddon. Parallel with Jezreel half-way southwards to the Dead Sea runs the deep ravine of a torrent thought by many to be the brook Cherith where Elijah hid from the wrath of Ahab. It rises below the north-east flank of the mountains of Ephraim where fountain heads (" living waters ") gush out from the lower part of the porous limestone of the hill country, at any rate in the rainy season.

On the east of Jordan the secondary set of lines runs not north-west and south-east, but rather, allowing for curves, west and east, and among these Arnon and Jabbok and Yarmuk are the chief streams, Arnon " the border between Moab and the Amorites " (Num. xxi., 13) to the south, Jabbok, " the border of the children of Ammon " (Num. xxi., 34 ; Deut. iii., 16) to the north, Yarmuk the northern limit of Israelite rule which spread at times over the sheep lands of Gilead, but never really established itself over the more fertile corn lands of Hauran to the north, lands made of deep volcanic mould that holds the rain. Between Arnon and Jabbok the land was the border of the desert with more fertile areas in Moab and Ammon. North of the Yarmuk the Hauran cornfields were under the charioteers of rich Damascus. It was the land between Jabbok and Yarmuk with its steep and ravined slope down to Jordan that Israel was able to hold, the land of Gilead, a refuge in many a crisis, as for instance in the decline of the fortunes of the house of Saul (II. Samuel, ii.), a land of oak woodlands, and of cornfields here and there among the pastures.

The structure has a very marked bearing on the strange complexity of climates within its narrow borders. The great block of Arabia has a climate of excessive drought, locally alleviated by the welling up of underground waters which make oases possible. Northwards it spreads to the foot of the Taurus line, north-eastwards to Mesopotamia. Palestine, Syria, the Taurus, and Mesopotamia all suffer less from drought than the interior of Arabia, and Breasted has given to them collectively the name of the " Fertile Crescent."

The rain-bearing winds and cyclonic disturbances which may bring rain at any season to northern Europe are felt along the Mediterranean in winter, and the climate is further complicated by the relations between the moister and more temperate air over the Great Sea and the denser, colder, drier air at that season over Asia Minor and North Arabia, which gives an extension to the mass of cold, dry air overlying the interior of Asia. The contrast between Palestine and Egypt in climate is well described in Deut. xi., where the variability of climate in Palestine and its dependence on the water of the rain of heaven is opposed to the dependence of Egypt upon the Nile. There are torrential rains at times in winter, and snow may fall on the Judæan plateau as well as on the mountains, but even at that season the Jordan valley is relatively warm, for the air is heated as it blows down into this very low line from the west. We thus get the strange story of Benaiah slaying the lion (a tropical beast of the Jordan valley) in a pit in the time of snow (II. Sam. xxiii., 20). Whereas the western flank of the Jordan valley is deprived of most of its rain by the disposition of its slopes away from the rain-bearing winds, those winds after warming up on their descent into the valley, are cooled again as they rise up the slopes of Gilead, so Gilead is able to support oak forest.

In summer the westerlies do not spread into the south-eastern Mediterranean, and rain and hail come only very occasionally (I. Sam. xii., 17) in connection with the disturbances between air over the sea and air over the land. The more regular winter rains terminate, as with us, in showers which fall as the latter rains before Easter, and presage the coming of warmth and the growth of crops (Deut. xi., 14 ; Cant. ii., 11 ; Joel xii., 23). About Easter the rains are over and gone, and in the early part of the dry season a dry, dusty wind blows out at times from the desert across Palestine to the sea. In summer there is often neither rain nor cloud for weeks at a time, but the alternation of heating of the desert by day and cooling by night often makes the wind veer round the whole circle of the compass in the course of 24 hours (Eccl. i., 6), the wind from the sea gathering strength as the day passes, so that the farmers of Hauran depend upon it for winnowing their corn in the afternoons.

After harvest in ancient Israel came the Day of Atonement (Lev. xvi.; Num. xxix.), with the driving of the scapegoat into the wilderness, followed by the feast of Tabernacles, during which the people dwelt in booths seven days while the land was at its driest, a memorial even to the cultivators of their treasured desert heritage. The coming of the rains (former rains) in October made the " earth soft with the showers " Psalm lxv., 10), thus rendering ploughing possible ; the rains increase thereafter into the winter. The special importance of the former and latter rains is thus evident, and it is also evident that, if they fail, it is usually a sign of general drought. Palestine gets a good deal of rain, considering its latitude, but much water soaks through the limestone rock and gushes out as seasonal torrents. It is thus largely wasted, and could be made useful only by irrigation and terrace cultivation, and this requires a tough social organization.

Hilltops where shepherds watch their flocks under the bright, cold stars, torrent ravines and fountains with little patches of exuberant vegetation, limestone plateaux with grass in season, but hardly any permanent turf, the low and more wooded hills of the Shephelah where Amos gathered sycomore figs (Am. vii., 14) and made his protests against both the wine lovers of the plain and the backward folk of the high plateau (Am. iv., 4), the coastal plain grading down to a sand-lined shore-waste, the olive-bearing plain of Sharon, Esdraelon with its mixture of cornland and marsh, the tropical Jordan valley, the wooded slopes of Gilead, and the cornfields of Hauran, such is the variety of little Palestine and its contrast over against the spacious monotony of the desert.

For the understanding of Palestine the desert is a factor of prime importance. Palestine is between the desert and the sea, and there is always the wilderness as a retiring place for the enthusiast and the idealist, as we see in the story of Elijah (I. Kings xix., 4-14). Gilead is in a special sense the border of the wilderness. In Mt. Ephraim the high plateau merges into the lower lands, and prevents the hill shepherd from maintaining his isolation untouched. The Shephelah gives another type of merging with less penetration of the low into the high land, and while Amos is obviously in touch with Philistria and the Syrians and Phœnicians, as well as with Edom and Judæa and Egypt, he speaks from a strong national base with its walled cities of defence and refuge against the nomads from the south. So we might deal with each region, but in place of this will sketch a general picture. To the men of the desert Palestine blossoms as the rose once the winter is over, it flows with milk and honey, milk from the cattle on the spring pastures, honey which the bees collect from the myriad flowers ; it has corn and wine and oil in the lower districts, with sheep and cattle on a thousand hills, and on the desert flank the camel bells tinkle along the road of the ford of Jabbok (Gen. xxxii.). With its rapid alternation of heat and cold (day and night), it is a land peculiarly subject to landslips, and the carelessness of man has reduced woodland and allowed terraces and irrigation channels to decay, so that the whole country now has an impoverished look. But at all times it must have been a land where the grass withers under the desert wind or the summer drought, a land where thunder and lightning could work havoc, where the locust might bring starvation.

Like Chaldæa and Egypt, Palestine is a small country, about the size of Wales, contrasting with Arabia which stretches through 20 degrees of latitude, and it is from the measureless desert that have come waves of nomads, sometimes driven by drought, sometimes also lured on by the greenery of the "Promised Land." The export of vigorous men is a feature of the desert ; they drink neither wine nor strong drink, but feed on fermented milk, as we see from the Nazarites (Num. vi.) and the Rechabites (Jer. xxxv.). They are proud and intractable goat herds and camel herds, so that the goat became the symbol of the wicked, and it became proverbial that the rebellious shall live in a dry land (Psalm lxviii., 6). They despised the cultivators, as the book of Joshua shows us, but the Baalim (Judges ii., etc.) as promoters of fertility of the soil continually drew away their allegiance from the tribal God of the desert nomads.

The nomads may fight well in a raid, but will not give continuous obedience, and Jacob's trouble with his sons is but one instance among many. They are terrible in their raids, and the Bible often tells of the walled city with its watchmen on the walls, as well as of deeds of horror, such as those at Jericho and Ai, but we see the habit of preserving the virgins (Num. xxxi., 18), as well as that of reducing the cultivators to servitude (in the case of Gibeon). In Palestine the nomad was faced with problems of social discipline, for which his desert life gave him no training. Israel made feeble efforts to meet the problem when her judges attempted to arbitrate problems of land tenure, as well as to lead in organisation and in war. But traditional political ineptitude of the desert nomad permitted only a temporary and long delayed triumph of politics under the able direction of David and of Solomon in his alliance with Phœnicia, which brought Israel into touch with world trade.

The story of Palestine is thus largely the story of contact between the desert and the sown. The man of the high Arabian steppe is bred in a climate, the stimulating power of which contrasts with the repressive influence of the desert of Gobi. He is a fine specimen, and the farmer acknowledges his superiority as we see in the police work of David's band at Keilah (I. Sam. xxiii.) and especially in the relations of David and Nabal (I. Sam. xxv.), and it is said that cultivators still send their sons to the men of the wilderness for part of their education.

Palestine also received elements of its ancient population from the hill countries to the north, elements represented in the Caananites and Hittites. The tall Anakim were another element, while the Philistines were immigrants probably from Crete.

Another result of the position of little Palestine is its connection with ancient trade. The Mediterranean and the Orient have exchanged products from a very remote past, as is testified by the account of the merchants out of Gilead and their camels laden with spicery and balm and myrrh going down into Egypt. Egypt with its stores of corn and settled wealth was able to buy the riches of the east, and the caravans made their way, during wetter cycles of climate, along several tracks through the north of the Arabian desert, touching Bosrá or Damascus at journey's end. These bazaar cities were the starting points for the next stage either to Tyre and Sidon or down into Egypt, and for the latter voyage the natural way was through Hauran, Jezreel, Esdraelon, Dothan, Sharon, and the land of the Philistines, along the coastal plain where there was food for the caravans. There were also at times practicable ways on the desert edge of Ammon and Moab. When Israel and Phœnicia were friendly there was a trade route southward via Hebron to the Red Sea, avoiding the Philistines and bringing wealth to Solomon, but both the traders of Phœnicia and the unpolitical Hebrews were unapt for such alliances.

Generally speaking, then, the hill country of Judæa, the nucleus of Palestine, stood rather apart from the trade route, treasuring its shepherd life on its hills above the little Philistine plain and priding itself on preservation of old customs and rites of the worship of Jehovah as well as of the high places. Its hardihood was such that in the course of long wars the superior material civilization of the Philistines had to give way before the rude vigour of Israel. The dominance of the trade route under the politically gifted kings, David and Solomon, Solomon's alliance with the people and the gods of Phœnicia, the evident anxiety of Ezekiel lest Tyre should fall, are all interesting indications that not only the vine and pomegranate and the fig tree and most of all the olive, but also the rich opportunities of trade were all lures to draw the rough herdsmen of the hills away from their early simplicity. This lure was inevitably stronger northwards from Judæa, for Sharon and Esdraelon are linked by the lowland plain of Dothan and the hills diminish in general height northward from Shiloh and are very narrow at Shechem, between Sharon on the west and the ravine of Cherith on the east, before they diverge on a lower scale towards Carmel and Gilboa respectively. Gilboa, like Ebal and Gerizim, on either side of Shechem, stands out with newer rock over the general limestone of the hill country. The lure of the lowland is illustrated by the substitution of Samaria, lower down, for Shechem. It led to the merging of the northern Israelites in their surroundings, but the men of Judæa, though able to learn from the plains, yet kept a little more to their old ways, for they were able to have a few olive groves and vineyards, and yet were dependent mainly on flocks and herds. In many other lands the struggle between hills and plain has been decided in favour of the plain, into which the hill folk migrate ceaselessly, but here, until both were drawn into the orbits of Egypt and the Euphrates, the issue was more doubtful and inclined in favour of the Judæan shepherd rather than the Philistine trader, who was no longer the most dreaded foe when the major prophets were thundering as leaders of the Tory party against the Progressives who sought a modus vivendi with Egypt or with Assyria or with Babylon.

Herders of the desert are constrained to live in the groups so well described in the preliminaries of the meeting between Esau and Jacob on his return from Padan Aram, and it should be noticed that not till the end of the book of Genesis does the horse come in ; he is, moreover, of limited importance in a country like Judæa, though his advent gave greater mobility and therefore greater power. The horse needs good food and much water, and is therefore a luxury, compelling its desert owner to have camels to give the horse milk and to carry water for it.

Desert groups follow or at times lead, the flocks and herds from pasture to pasture, and for this work experience is valuable, so that age is held in respect. The patriarch in some sort personifies the ancestry of the group of kinsfolk, with a birthright of authority, of ceremonial and of counsel. Under him the group is largely communist in its organisation, i.e., it has very little development of personal property, in its wanderings it has little opportunity to lay up treasure on earth, and this is reflected in the sayings of the idealists, who contrast it with the practice of the settled folk enriched by cultivation and, far more, by trade. Disputes arise within sections of the group, especially about wells, as we learn from the story of Isaac's men who dug a well at Gerar (Gen. xxvi., 17-25) and from the story of Abraham and Abimelech (Gen. xxi.-xxv.). Hostilities are remarkably tempered by laws of hospitality.

There is no fixed court and little, if any, written record, and, with society on a kinship basis, quarrels often lead to blood feuds which became mitigated, as settlement developed among the Hebrews, by the institution of cities of refuge, a system which may be compared with that of " right of sanctuary " in mediæval Europe. As with us, so in Palestine, some at least of the cities of refuge seem to have been places of traditional sanctity (Shechem, Hebron, etc.).

The group takes pride in all that keeps it together, in its oral tradition and in the songs of its bards glorifying its past, in the ceremonies of its worship of the paternal God who makes it to lie down in green pastures and leads it beside the still waters (the pools), when torrents in the valley of the shadow of death would drown the young flock. Such groups coming into Palestine were deeply concerned with the complexity of the environment and the fear of the Baalim or local gods of the patches of rich vegetation, worship of whom led men away from the tribal group of kinsfolk into the neighbourhood groups of the cultivators. Religion was guarded from foreigners, but circumcision was allowed to them as a compromise admitting them to the sacred rites. The herdsmen had little opportunity in their wanderings to gain skill in stone-work, and regarded graven images as a sign of the despised cultivator, whose collection of " idols " representative of the many spirits controlling a complex environment bespoke an idea of religion utterly different from the simple one of the desert. There the well and green pasture was the gift of the tribal paternal God. The wanderer worshipped the stars and moon that helped to guide his journeys during the cool nights through the trackless wastes where the thorny thicket with its lion or the wild rocks with their hyenas were the abode of demons or, as the Arabs call them, jinns. As the Israelites settled in Palestine, the well became less the gift of God and more the evidence of man's skill, and the new importance of rain made men turn to the local gods of vegetation, whose association with the sacred soil was so close that Naaman begged for two mule loads of earth (II. Kings v., 17) from Canaan to place thereon an altar to the God of Israel. The spiritualisation of worship and its liberation from local limitations proceeded only gradually.

Desert nomads, like mountain peoples, often learn to get æsthetic enjoyment in their poverty from the spoken word, and not only the bard who memorises their tradition, but also the orator who urges them to action, stand out in their life. The weakness of caste ideas among the nomads, as well as the looseness of discipline, makes easier the rise of the orator, and in the case of Israel the imperilled tribal tradition fading in contact with the complex comfort of the settled Canaanites gave a stimulus to the prophet and made him powerful both critically and emotionally. In David's reign Zadok the Priest and Nathan the Prophet work together, but the tendency afterwards is for the groups to diverge. The conservatism of Judæa made it the ritualist stronghold and gathered to it the Levites ; the close contact of Samaria with foreigners weakened the old tradition there, but, as a reaction, sent out the prophets like Elijah the Tishbite (Gilead) to think and to preach. The prophetic tradition freeing itself from priestly and political connections progressively sifted the more permanent elements of Hebrew tradition.

Summing up thus far we may think of escaped slaves and captives wandering near the border of Egypt about 1400 B.C. when, it would seem, a number of dry seasons weakened the links between Egypt and Babylonia and drove the desert peoples towards the rain. They gathered under the leadership of a wanderer, Moses, and fused together, accepting the Levite group probably much as the Brahmans were accepted by the Indo-Aryans in India. The intellectual and rit al struggles of the fusion are mirrored in the story of their life near Sinai, and the influence of desert nomad elements becomes stronger and clearer thereafter (Num. x.).

They occupied the hill country between Jabbok and Yarmuk east of Jordan, having some hold (Reuben) south of Jabbok, and a variable, doubtful relation with the northern region towards the Yarmuk. From the crossings of Jordan near Gilgal, and probably Succoth, they extended their power over the hill country of Palestine proper, west of Jordan from the wilderness of Judæa to the Carmel range, and then also north of Esdraelon in the hill country from Jezreel, Endor and Tabor up towards Lebanon. The neighbours of Israel are discussed by the prophets and especially clearly in the series of denunciations by Amos. To the south-east lay the land of Moab, a still smaller analogue of Israel, more exposed to the nomads. East were the Ammonites, and north-west was the corn land of Bashan (Hauran), and beyond it the oasis of rich cultivation that made possible the great bazaar city of Damascus. On the south in the wilderness the power of Israel was fragmentary at first (Simeon). To the south-west lay the Philistines, a people led by settlers from the sea who were themselves refugees probably from Crete following the break up of Cretan civilization in the early Iron Age. Jeremiah calls them the remnant of the country of Caphtor. The book of Samuel tells of their skill in iron work, and shows how backward were the Israelite shepherds (I. Sam. xiii., 19-22). Their coastal plain could grow rich fruits in some parts but in the first place it had no particular resources in iron, and in the second it was a mere station on the great high road between Egypt on the one hand and the Hittites, Phœnicia, Damascus, and Mesopotamia on the other, and as Jeremiah saw, it could not permanently maintain itself against the chariots of Egypt, and Isaiah, Micah and Amos tell of the Philistine doom. At first with the more or less amalgamated Canaanites of the Shephelah, as we may judge from the story of Goliath, who was apparently of the Anakim, the Philistines seem to have dominated the lower hills, but in Saul's reign we have campaigns that, with the rise of David and Solomon, turn them out of the Shephelah and restrict them to the coastal plain. There is no Philistine power in the days of the Maccabees, though Ashdod and Gaza are of lasting importance, and Dagon was still worshipped at the former place at least. Canaanites with Philistine admixture were also in command of the roses of Sharon until the great days of the Kingdom, but came under Solomon's rule, though the kingdom of Isreal seems to have lost part of this land, retaining, however, some of the coast land south from the slopes of Carmel. Esdraelon, again a region of fertility, remained outside early Israel, but appears to have come under David and Solomon. Jezreel, far narrower, and a passage to the hill country towards Tabor, was Israelite far earlier. The Phœnician coast, still another region where rich fruits could be grown and where also sea trade developed, never amalgamated with Israel, though there was an accord in the days of Solomon, and Ezekiel tells us that later on the men of Judah and Israel were merchants in the employ of Tyre, trading in wheat and honey and oil and balm and the unknown " pannag " (Ezek. xxvii., 17).

Esdraelon, Phœnicia, Geshur and the Arameans, all more or less cultivators and traders, were too much for the northern kingdom, and it lost its distinctive tradition and was ruined bv the Assyrians. It had allied itself with Egypt. Judæa, in its hills held out more than a century longer, just as Jerusalem had held out till David's time against the tribes of Israel, but it fell before the attack of the Babylonian armies. The northern kingdom under Assyria was almost completely lost, save probably for a remnant of the Samaritans among their hills. Judæa, led captive to the more civilized Babylon, probably with a remnant left in the old country, was able to maintain the prophetic and bardic traditions and its thinkers were brought into contact with abstract thought, which evidently led the leaders to discriminate the more spiritual and the more ethical elements of their heritage and to treasure them with a minimum of ceremonial (including circumcision) as they sat down by the rivers of Babylon. The intermittence of connection between Israel and Mesopotamia from the days of Abraham to those of the captivity, as judged from the silence of the chronicle, is evidence of the variations of development in these lands of alternating climate. Damascus is perpetually concerned with Israel.

The return from the captivity introduces us to Palestine under a new aspect. It is no longer mere herdsmen from the desert who are spreading their power over the hills. It is a people refined and stimulated to intense religious feeling by suffering on the one hand and by contact with wide thought on the other, conservatively proud of its distinctive inheritance and its insistence on its own rites. Its leaders have grown out of the fear of Baalim and the old localism of deity, but remain resolutely opposed, as were their forefathers, to intermixture of their religion with others after the fashion of easy compromise so widespread in Mediterranean lands. The strong conservatism of this process and the ensuing danger of formalism in the minute observance of traditional ritual, the reason for which was gone, is set off by the magnificence of the prophetic inspiration which accompanied it. Of survivals of ancient local cults in popular tradition we can have little doubt.

It was Jerusalem that focussed the people's ideas at the return from exile (Psalm 87), but Jews, as they may thenceforward be called, spread as colonists over the hill lands as of old, going around to avoid Samaria which had preserved some remnants of its old individuality. The realisation of this process of colonization helps one to understand the frequent journeyings of Jews from the hill country of Galilee, as it may be called from the days of the Maccabees onwards, to Jerusalem for Passover.

In Galilee the Jewish colonists were evidently in close contact with Gentiles, especially in so far as they were able to spread down towards the almost tropical Gennesaret and the Jordan valley below it. The colonists are no mere herdsmen, but cultivators making homes and gathering in groups in their synagogues to refresh themselves at the fountain of their tradition, the now written law, but there is conflict of thought between Galilee, impelled forward by contact with the outside world and Jerusalem, the headquarters of conservative tradition.

What was true of the hill country of Galilee must be true in a special degree of the hill city of Nazareth, for from a neighbouring hill brow its citizens looked across the great plain of Megiddo or Esdraelon towards the Carmel range, the outpost of the hill country whereof the head was Jerusalem.

The teacher who is interested should follow this up by reading Doughty "Travels in Arabia Deserta" or its abridged form published with the title "Wanderings in Arabia," H. St. J. Philby's "The Heart of Arabia," Sir G. A. Smith's "Historical Geography of the Holy Land," Sir W. M. Ramsay's "Education of Christ," etc.—Ed.

India in Pictures. H. Clive Barnard. A. & C. Black. 1922. 24½ cm x 18½ cm. 3/6. 32 colour and 21 half tone illustrations.

Visual Geography. Children of the World. Agnes Nightingale. A. & C. Black. 1922. 22½ cm. x 17½ cm. Paper covers. 1/-

In these two books Messrs Black continue their tradition of illustrating the pictorial side of geography for children. The former should prove a useful text book for children of 11 to 14 years. The latter is intended for the use of quite small children, who could colour the outline pictures with crayon or paint.

Map of Spain and Portugal. Map of Italy. J. Bartholomew and Son, Ltd. On paper, folded 1/6, on cloth, folded 3/- each. Scale 1 : 2,000,000, about 28 x 20 inches.

These useful maps maintain the reputation of our great firm of map-makers. They are printed in green, brown and purple for the land and shades of blue for the sea. Railways have been brought up to date and the detail seems to be as correct as possible. We hope this series will extend itself over the whole of Europe.

Notes on Archaeological Information incorporated in the Ordnance Survey Maps. Part I. The Long Barrows and Stone Circles in the Cotswolds and the Welsh Marches (Sheet 8 of the quarter-inch map). By O. G. S. Crawford, B.A., F.S.A., Archæology Officer, Ordnance Survey. O.S. Professional Papers, New Series, No. 6. London (H.M. Stationery Office). 1922. 4to., pp. 11, with map and two plates. Price 4/6 net.

This valuable memorandum on the principal early monuments of the Cotswolds and the Welsh Marches will be welcomed by geographers no less than by archæologists, for it is an admirable example of the uses to which it is now becoming possible to apply the rich store of topographical materials which the Ordnance Survey has been accumulating since its establishment, and of the conclusions, interesting not only to the specialist and the teacher of geography, but also to the tourist and the public generally, which may be drawn when this material once becomes copious enough to be classified and analysed. Especially is such a monograph as this to be commended to the teachers of geography within the area which it covers, or bordering upon it; for it will supplement their equipment for field work within their classes at a point where there has hitherto been no adequate guide; and Mr Crawford has been careful to prepare his readers to appreciate the topographical details which form the body of his memoirs, by the aid of a short, clear, and most suggestive introduction covering all the chief topics which are likely to arise in any discussion of these early monuments and the life-history of their builders.

The reception of this instalment by teachers and antiquaries in general will, we may hope, be sufficient to induce the Director General of the Ordnance Survey to provide similar facilities for the geographical study of other regions also. J.L.M.

The Displacement of Continents—The Wegener Theory.

John I. Platt, B.Sc., F.G.S.

ALTHOUGH Professor Alfred Wegener, Director of the German Oceanographical Survey, published his theory of the origin of continents and oceans in 1915, it is only within the last few months that British scientists have directed their attention to it. A second edition of his book, published in 1920 under the title " Die Entstehung der Kontinente und Ozeane "—the origin of continents and oceans—is responsible for the interest which has been created. Stated briefly, the theory is that the large continental masses of the world have drifted, and in some cases are still slowly drifting across the globe, the drift being in two directions, from the poles toward the equator and from east to west. The movement has taken place since Carboniferous times, for at that period, according to Wegener, the land masses of South America, Africa, Australia, India, The Falklands, and Antarctica, clustered together around what was then the South Pole. If this be true, it undoubtedly solves the problem of the Permo-Carboniferous ice age in the Southern Hemisphere, traces of which are found in all these lands which are now so widely separated.

For many years it has been recognised, from pendulum observations, that the rocks of which mountain ranges are composed are of a lower density than those of the surrounding low lying country, so htat a state of equilibrium is maintained between the two. Wegener has carried this still further, and assumes that the continental masses have a comparatively low density when compared with a heavier substratum on which they rest and which forms the floor of the ocean deeps. The lighter stratum, " Sial," is composed of acid rocks, being rich in silica and alumina, and is capable of movement upon the heavier stratum " Sima," which is composed of basic rocks rich in iron. The " Sima," he maintains, reaches its highest levels beneath the oceans, and a state of equilibrium is maintained by its being depressed beneath the continents where the " Sial " rests upon it.

It is impossible to enter into the details of the theory, and so only an attempt to indicate a few of the views and opinions of various British scientists upon it, will be made here. The book has not yet appeared in English, but the work of translation is now in progress. An article written by Wegener himself appeared, however, in the May issue of " Discovery," and in this the author briefly puts forward his theory and indicates its relationship with the various natural sciences concerned. He shows that in working up his theory he has gathered together a large mass of scientific information. This he has chosen from the various sciences concerned, and the chief points made by his critics lie in this choice, in the use to which he puts the facts and observations chosen, and in the manner in which he totally ignores other facts which are against the theory. The accuracy of some of the astronomical observations is criticised by Dr. J. W. Evans,[2] and that of many geological assertions by Mr. Philip Lake.[3]

The latter, Mr. Philip Lake, draws attention to several very obvious cases, one of which is undoubtedly a misrepresentation. Wegener, in his attempt to show the westward drift of America, maintains that the Northern Highlands of Scotland were at one time contiguous with Labrador, and that the strike of the Hebridian gneiss in the former is from north-east to south-west, whilst in Labrador the strike of similar rocks of the same size is from north-east to south-west, whilst in Labrador the strike of similar rocks of the same age is from east to west, so that when the two masses are brought together the strikes fall into line and become continuous.

On this point Mr Philip Lake comments :—

" Wegener asserts that in the gneiss of the Hebrides and Northern Scotland the strike is north-east to south-west. The Survey Memoir on the North-west Highlands gives the prevalent trend as west-north-west to east-south-east or east to west. If the asserted direction is evidence in favour of the union suggested, the actual direction must be evidence against it."

Wegener himself admits that the theory conflicts with the fundamental views of several sciences, especially geology, and on this point many geologists in this country agree, although on the whole British geologists are disposed to consider the theory. They recognise that the theory is a new one, see in it much that is good, but point out the errors in the hope that by correcting them and holding discussion upon them it may lead to an increase in our knowledge and assist in our search for the truth.

One such fundamental view of geology is that there existed in the North Atlantic Ocean until Tertiary times a large continent, called by geologists " Atlantis," along the southern shores of which sedimentary rocks were repeatedly laid down during the Palaeozoic and Mesozoic periods. These rocks were folded at various times and were crumpled up against the stable ancient land mass forming parallel ridges, and so adding to the land mass. In early Tertiary times this continent was submerged, and the submergence was accompanied by the large outburst of lava in the Brito-Icelandic Province.

With this in mind Prof. O. T. Jones[4] writes :—

" The correspondences between the rocks, fauna, and direction of the mountain chains on opposite sides of the Atlantic is explained very simply as having been each determined by the trend of the coastline at different periods. This simple theory thus presents a consistent picture of the geological history of the northern hemisphere from the earliest times to the Tertiary Period. Its simplicity may be contrasted with the extravagant assumptions which Wegener is forced to make in order to square geological facts with his theory."

On this point Dr. W. J. Evans, who opened a discussion on the Wegener theory at the British Association this year, comments :—

" There is some evidence of a slow drift away from Africa and toward the Pacific, but there is nothing to show that this has been as rapid as is assumed by Dr. Wegener. The Atlantic may have come into existence since carboniferous times, but this would not mean a separation equal to its whole width, as part of the submergence would be caused by faulting down towards a region of tension."

Wegener first conceived the theory when he noticed the similarity of coast line between the eastern coast of America and the opposite shores of the Atlantic. He therefore commenced to reconstruct the land areas and to fit them one into another after the manner of a jig-saw puzzle. Experiments showed him that it is necessary to do this reconstruction on a globe, as ordinary plane maps are in all cases distorted. For this purpose he used tracing paper, and took the edge of the continental shelf as the boundary of the " Sial." Lake comments on these ideas, and has shown that in the former case :—" . . . it is easier to obtain an accurate representation of the mass of Sal (Sial) by applying a sheet of plasticine to the globe and cutting it into the shape required."[5]

And in the latter case he writes :—

" It is necessary, first, to determine the present shapes of the existing masses, and . . . according to his own idea the masses of Sal (Sial) float in the Sima, and the Sima forms the floor of the ocean. The boundary of the

Sal (Sial) should therefore be drawn at the foot of the continental slope . . . instead, he takes the edge of the continental shelf as the margin of the Sal (Sial), though, as he says, he allows himself a certain freedom."[10]

As is brought out above, the Displacement Theory does away with the necessity of any supposed oceanic land-bridges. For this one reason it is supported by eminent biologists and palæontologists. Prof. F. E. Wiess[5] writing on the theory states :—

" The Atlantic Ocean, which is thus of comparatively recent origin, has severed the formerly homogeneous floras and faunas of these two continents (Europe and North America). This would account for the fact that certain plants and animals are found to be common to Western Europe and Eastern America, without calling into aid land-bridges or sunken continents to explain their distribution, as has been done in the past."

Mr. W. B. Wright introduced the subject at a meeting of the Manchester Literary and Philosophical Society on March 21st of this year. He believes that there is much in the theory, which is enquiry in the right direction. The following quotations show his opinion :—

" It might be illusory, but it explains many phenomena that no other theory explains, and up to the present is the best that has been put forward."[6]

"The geological reconstruction thus rendered possible can be made to explain many geological and biological anomalies which former theories have only dealt with in a clumsy and disconnected manner."[7]

" Geologists are not as a body rejecting the theory."[8]

The theory is new, and like all new theories it undoubtedly contains some errors. It is receiving severe criticism, the most adverse criticisms being on the geological data which Wegener uses. The author of the theory admits in his book that he has only " got up " the geological corroboration since the idea first came to him, and so those facts which agreed with his theory he has used and those which did not he has completely ignored. Of these latter some will probably be found to support the theory after a little enquiry has been made into them. Whether the theory will stand the test of the criticism which it is receiving remains to be seen. The opinions expressed at the British Association meeting this year, when the matter was brought up for discussion, were on the whole favourable to it in a general way.

In conclusion one cannot do better than again quote Mr Philip Lake :—" It may be said that Wegener has performed a valuable service by drawing attention to the fact that land-masses may have moved relatively to one another. He has not proved that they actually have moved, and still less has he shown that they have moved in the way that he imagines. He has suggested much, he has proved nothing."

A third edition of Wegener's book was published in June of this year, and a translation is being undertaken by Mr J. G. A. Skerl, of the Geological Department, Liverpool University ; it will be published by Methuen and Co., Ltd., in the spring of next year.

[1] A. Wegener.—" Die Entstehung der Kontinente und Ozeane."—Vieweg and Son, Braunschweig. 2nd Ed., 1920.

[2] British Association—Journal—1922. P. 23.

[3] Geol. Mag., 1922, August. P. 343.

[4] Manchester Guardian, April 1st, 1922.

[5] Manchester Guardian, March 18th, 1922.

[6] Manchester Guardian, March 16th, 1922.

[7] Manchester Lit. and Phil. Soc.—Abstract. March 28th, 1922.

[8] Manchester Guardian, April 6th, 1922.

[9] Geol. Mag., 1922. Aug. P. 341.

[10] Geol. Mag., 1292. Aug. P. 340.

A Practical Geographical Demonstration and Exhibition.

BY THE NORTHAMPTONSHIRE BRANCH.

KINDLY COMMUNICATED BY MR. E. E. FIELD, HON. SEC.

KENYA COLONY AND TANGANYIKA TERRITORY.

THIS Branch, during the course of the Spring Term, completed the first of a series of practical demonstrations of the resources and possibilities of development of some of the larger British Colonies and Dependencies.

The conception of the scheme was due to the feeling that the value of the geographical work of the Branch would be increased considerably by the carrying out of some scheme in which all members would have the opportunity of taking part, and which, upon its completion, would have some definite geographical and educational value.

The general idea was to take one or more of the larger undeveloped colonies and to show its conditions, resources, and urgent needs for development, as vividly and forcefully as possible.

It was decided to work upon the two East African Colonies—Kenya Colony and Tanganyika Territory.

The various points to be demonstrated were dealt with by " sections." Each of these " sections " conveyed its information in a variety of ways—by maps, diagrams, pictures, photographs, models, exhibits, and by verbal explanation. A point emphasised throughout the preparation of the sections was that each should be as far as possible " self-evident and self-explanatory." Each section was to speak for itself.

Those members who were taking an active part in the scheme were divided into groups, one group to each section. The number to each group varied according to the amount of work entailed by a section.

Some three months were devoted to the collecting of information and materials and to the preparation of the various sections. Meetings were held at intervals to co-ordinate the work of the sections, to exchange ideas, and to pass on any exhibits which might be of use to other sections. At these meetings also, progress was reported and the work of sections kept more or less in line.

Almost at the outset it was thought to be wise to have a " key-map " for each section. Each " key-map " was of the same scale (1 : 2,000,000), and showed boldly the main theme of the information of the section. Additional maps and diagrams were added in sections where the one " key-map " was insufficient.

The preparation of the work and the final demonstration necessitated the use of a fairly large room for a period of four months. After considerable difficulty in this direction the Northampton Borough Museum Committee kindly granted the use of one of the smaller halls of the Old Museum. This had the great advantage of being centrally situated.

The work of collecting information and materials proved to be unexpectedly difficult. This was, of course, mainly due to the fact that the colonies chosen were new and very little developed. Work upon an old colony would have been much simpler, but at the same time of considerably less value.

Geographical text books were found to be valueless. Help was, however, obtained from the Colonial Office in the matter of reports, and certain valuable handbooks were obtained from H.M. Stationery Office. The Director of the Imperial Institute very kindly gave help and provided an excellent set of specimens of the vegetable products of Kenya Colony and some help for Tanganyika, but for the latter the Imperial Institute had little information.

For the remainder, information and exhibits were obtained in many ways and from a variety of sources too numerous to mention in detail. Private individuals connected with the colonies, manufacturers, and produce importers of various kinds were approached. Many could provide nothing, some did not reply, but by much untiring work and correspondence the members of the various sections gathered together a most helpful collection of information and exhibits.

The sections were arranged round the hall in geographical order. In the centre of each was the " key-map," and above each the number and title of the section was boldly displayed. As far as possible, everything was labelled simply and clearly. If it were a product of economic value, its use was indicated, and in manv cases examples of the finished product shown, with stages in the manufacture. Diagrams of the world produce of such commodities were frequently added.

The following is a brief outline of the sections. Of necessity it gives only a few of the outstanding features of each :—

1. POSITION, SIZE, AND ACCESSIBILITY.
   Key-map. Topographical map, with boundaries and ports specially marked.
   Chiefly maps, diagrams and pictures.
   Map of world position. Position in Africa.
   Diagram of size. Comparison with British Isles.
   Sea routes. Steamship lines. Distances.
   Pictures of coast and sea-ports.

2. BUILD AND RELIEF.
   Key-map. Orographical.
   The main feature was a large scale relief model done in plasticine.
   Section from the coast through Lake Victoria.
   Comparison diagrams for heights of East African peaks.

3. CLIMATE.
   Key-map. Annual rainfall and winds.
   Again chiefly maps and diagrams.
   Introductory map showed position of the colonies in " vertical sun " belt.
   Diagram showing effect of vertical compared with oblique sun.
   Diagrams of wind, temperature and rainfall distribution.
   Comparison diagrams for the above with British Isles.

4. NATURAL VEGETATION AND ANIMAL LIFE.
   Key-map. Natural vegetation belts.
   A large collection of specimens and photographs.
   Skins and heads of many animals. Snake skins.
   Stuffed specimens of smaller animals.
   A very complete collection of insects and eggs.
   Pictures and photographs of various areas.
   A collection of natural vegetation products which are of economic value.

5. CULTIVATED PRODUCTS AND MANUFACTURES.
   Key-map. Zones suitable for crops and plantations.
   A large collection of specimens of the various things which are cultivated and are possible of cultivation in the colonies.

Cereals. Pulses. Fruits. Copra. Tobacco.

Various textile fibres with specimens of the finished manufacture and stages in the processes.

Bamboo and bamboo paper.

Hard woods. Tanning bark.

Each exhibit had attached a short but clear account of its growth and use. A series of diagrams showed the chief world areas for the same products.

6. MINERALS AND MINING.

Key-map. A very simple geological map.

A very complete collection of minerals and rock specimens was shown in relation to the map by means of tapes of two colours. The minerals worked were grouped together and a tape from each led to its area in the colony. Minerals at present not worked were grouped together and areas on the map linked to them by tapes of another colour.

The economic uses of each mineral were given.

The importance of the Magadi soda was specially illustrated.

7. NATIVE POPULATION.

Key-map. Showing distribution of some of the chief native races.

A number of photographs showed the types of natives, their mode of dress and living conditions.

Actual specimens of weapons, ornaments, drums, charms, and native carving work were shown.

8. WHITE POPULATION.

Key-map. Suitable areas for white settlement.

Photographs showing local conditions and settlements.

Details of present white population.

Model of a white settler's house.

9. POSSIBILITIES OF DEVELOPMENT.

No map.

This section was a small one. It set out boldly and simply the various undeveloped resources of the colonies and the chief things that are needed for the devlopment of these resources.

10. COMMUNICATIONS.

Key-map. Orographical, showing railways and roads.

The present state of construction of railways and roads was clearly shown, as well as the probable lines of development of further railways.

The importance of internal communications in relation to the development of resources was shown.

Finally, a large collection of photographs of a general nature, taken in the colonies, was shown ; and in addition, a set of stereographic views was available.

Upon completion, all schools in Northampton were given the opportunity of sending parties to the demonstration. Each party consisted of forty, in charge of a teacher. The time allotted for the visit of each party was forty minutes. The " self-explanatory " method of setting out the information made it necessary for only one member to be present in charge whilst parties were visiting. This work was shared and planned by time-table, and the necessary permission for teachers to attend during school time for this purpose was readily given by the Local Education Authority.

A time-table for schools was drawn up with considerable care, the numbers of parties from each school being proportional to the size of the school.

The Director of Education (Mr A. C. Boyde) very kindly arranged for parties to visit the demonstration in school hours, and thus made it possible for much larger numbers to attend. The opening meeting was an evening one. To this all teachers were invited, especially those teachers who would be bringing parties on subsequent days.

The demonstration was open for sixteen days, and during this time about 3,500 attended. Extra meetings were held on some evenings to give an opportunity for anyone interested to attend. Considerable numbers of people other than members of schools thus visited the demonstration and expressed great interest.

From the opinions expressed by all sections who saw the demonstration it is felt that the work done was thoroughly justified.

The demonstration was later given in Wellingborough for the schools of that district, and was attended by large numbers.

The branch hopes to be able at a later date to deal with another part of the Empire in a similar manner. Any enquiries will be welcomed by Mr Field.

I.D. 1168. A Manual of Belgium and the Adjoining Territories. 596 pp., 22½ cm. x 14½ cm. 10/6. H.M. Stationery Office. N.D.

Published with the volume is an atlas giving, amongst other useful maps, density of population, languages, woods and forests, density of industries, pottery industries, paper mills, glass works, waterways. The book has a ten-page bibliography and an appendix giving the chief treaties relating to the district from 1814 to 1870. The commercial treaties are dealt with in a special chapter, in which their economic results are discussed. The manual is of the utmost importance to students of the complicated economic problems of the coal and iron fields of this border region. Statistics of production are given up to 1912. The first 244 pp. are given up to the history of Belgium, Luxemburg, and the Rhine-land, while the remainder of the book is devoted to discussion of social conditions, the Flemish question, agriculture, mineral resources, industry, communications and commerce.

The Heart of Arabia. H. St. J. B. Philby. 2 vols., 48 full page illustrations, two folding maps and plan. 23 x 14 cm. £3 3s. 0d. Constable. 1922.

The author of this fine record of travel and exploration has been awarded the Gold Medal of the Royal Geographical Society as a token of the value of his researches during his journey across Arabia from the Persian Gulf to the Red Sea. Readers are referred to The Geographical Journal of December, 1920, Vol. LVI., No. 6, pp. 446—468, for an interesting discussion on the importance of his work in connection with the controversy as to the accuracy of Palgrave's descriptions. The folding map of Southern Nedjd, giving the results of surveys carried out by the author and by Lieut.-Col. Pelly in 1865, is of the utmost importance for an understanding of the drainage and topography of the district. It shows that the theory of a uniform north-easterly slope of the Arabian peninsula needs considerable modification, and on pp. 151 and 2 of Volume I. there is a careful résumé of the new discoveries affecting this point. The usefulness of the map is increased by an Arabic glossary of the principal geographic terms used. The work is a serious contribution to the scientific side of geography, but it is more than this, for it is a storehouse of first-hand descriptions of the daily life of the varied Arab tribes with whom Mr Philby lived in intimate contact, and of the weather, the scenery, the flora and fauna of a region about which too little has been known. Lovers of Doughty's " Travels in Arabia Deserta " will rejoice in this opportunity of making further acquaintance with the intimate daily life of the people in these fascinating regions. There is much matter for the historical student as well as for the descriptive geographer, the Wahhabi movement being treated in special detail, because Riyadh was Philby's great centre; the book gives a plan of this city. The geographer who is interested in politics will get from this book many sidelights on the diplomacy of the war-time. The photographic reproductions which illustrate the book are a valuable help for teaching and study. This is essentially a book for a good school library, for one feels that any healthy boy would be drawn inevitably into studying it if he found it there.

A Cruise to Lisbon, Madeira, and the Canary Islands.

MISS M. S. JOHNSTON, F.G.S., F.R.G.S., F.Z.S.

THE aim of this article, with its pictures, is to show how many geographical details may be observed, during a short voyage, which combines instruction, pleasure and restful recuperation, under most comfortable conditions. The voyage was a three weeks' cruise, taken during May, 1922, on the S.S. ' Alondra,'' one of the Yeoward Line boats, which fetch bananas from the Canary Islands and carry a certain number of passengers. I should especially like to bring this cruise to the notice of teachers and others interested in geography, as it is not an expensive trip, and is intensely interesting, besides which the care and attention given by the officers and crew of the vessel make it one of real comfort and enjoyment. The route taken was from Liverpool, with a stay of three days at Lisbon, thence to Madeira (one day's stay) and the Canary Islands (five days) (Fig. 1), and thence back to Liverpool.

From the start there are interesting things to see and note. The wide estuaries of the Dee, Clwyd, and Conway ; the distant Clwydian mountains, succeeded by the massif of the highest mountains of Wales, and the low featureless line of the island of Anglesey. The curious cut-off appearance of Moel Siabod, seen against the sky to the east of the Conway mountain, is in striking contrast to the usual peak-form of the other Welsh mountains. While crossing the calm, blue Atlantic, to the west of the Bay of Biscay, sea-birds, occasional whales, and schools of porpoises are the chief excitements.

Our first port of call was Lisbon, and it is quite worth while to get up at daybreak to see the boat enter the mouth of the Tagus, between the low north-western shore and the lighthouse which is on the extremity of a sandbank stretching away south-east to the foot of the cliffs of the opposite shore and forming an impassable barrier to ships, as even at high tide it is only just washed by the long white breaking waves. On the right hand side, going up the river, are steep cliffs, of no great height, with small villages on the top and factories clustering at the base, while quarries scar the steep slopes. The north-west bank, on the other hand, is low, with a level ridge of hills a little way back from the shore. Near Lisbon the character of both banks changes suddenly. The cliffs on the right end abruptly and the shore swings back at right angles, the river becoming a large oblong shaped lake, surrounded on three sides by sandy shores and low foot-hills, with mountains in the distance on the south, as seen in Fig. 3. The size of the lake can be estimated from the photo which was taken through a main-deck port-hole of the " Alondra " when she was tied up to the quay at Lisbon. The city is situated on the north shore, or fourth side of the lake on steep hill , intersected by ravines. Figures 2 and 4 are a panorama taken from the top deck, overlooking the artillery barracks (above the entrance of which is a very fine piece of statuary), up to the church and seminary of Sâo Vicente and the church of Santa Engracia on the summit. The gradients of these hills are very steep, both towards the river and up the ravines. The direction of the slipping during the Lisbon earthquake, 1755, was along the steep face. The principal streets and squares are in the wide valley, in the centre of the city, just beyond the left in Fig. 2, which runs up from the river bank behind the ridge of houses, as far as the end of the Avenida da Liberdade. The square, Praça do Commercio, fronting the river, is very fine, surrounded by the ministerial offices, with the triumphal arch and the bronze statue of Dom Pedro in the centre. The beautiful black and white pebble pavement of the Rocio or " Rolling Motion Square " is unfortunately nearly all destroyed.

The passengers on the " round cruise " need no passports, but pay sixpence as a kind of poll-tax on the first time of landing at Lisbon. There is always plenty of time to explore the city and to study the customs of the people. The following are a few things noted :—The Portuguese are very fond of flowers ; the market of the Praça da Figueria was full of bouquets, and nearly everyone seemed to be carrying a posy. The peasant women, who do most of the hard work, are very sturdy and carry great weights on their heads ; for long distances they go bare-foot. Large quantities of fresh sardines and a fish like a mackerel were being hawked on flat trays made of basket work. One curiosity I saw being offered for sale in the main street was three fine peacocks. A boy had two lying in a basket, whilst a man carried a third under his arm. The manufacture of a rough, highly-glazed pottery is one of the industries, while the wine and olive oil trades are vigorously carried on at the east end of the city. Most of the wine is brought in small casks by sailing boats. It is transferred into larger casks, which are carried through the streets slung on a curved iron rod between the two wheels of small carts drawn by mules. Oxen are also used as draught animals.

Behind the east end of the city (Fig. 5) are long low ridges, ending steeply at the river. Olives are cultivated on these hills, and vegetables and corn grown in the valleys. The agricultural implements are still of a primitive kind, the half-moon shaped hoe being one of the principal. A similar hoe is used in the Canary Islands, and the man in the view at Monte (Fig. 14) is carrying one on his shoulder.

Beautiful wild flowers can be gathered in these fields and hedges. I got a small Spanish iris, speedwell of vivid blue, mauve thistles (Cnicus), acanthus, the vine-leaved magenta Convolvulus althasoides, white roses, with bright green glossy leaves, etc. If one behaves quietly and carefully, the peasants are very kindly, and let one wander about alone unmolested. There was a small quarry of friable sandstone, capped by a harder sandstone with casts of fossils, near this place.

The streets of Lisbon are all cobbled with a compact basalt, very tiring to walk on. Many of the houses are covered on the outside with glazed tiles (azulejos) with patterns in gay colours. There are several churches, that of Sâo Vicente contains the embalmed bodies of the dead kings in glass-topped coffins. Sâo Roque is now kept as a museum. It has a chapel adorned with mosaics, lapis lazuli, malachite, and silver-gilt. Besides these there is the beautiful cathedral of Belem and its cloisters. The zoological and botanical gardens and the smaller public gardens are gay with flowers. The " Principe Real " garden has a trained spreading cypress, extending over three rows of seats set in circles.

The long day excursion which is planned for those who care to go is full of interest of all kinds. We started in cars at nine a.m. in bright sunshine, and turning up through the main squares were soon out amongst the long, low ridges of hills which border the north-west bank of the lower course of the Tagus. The hills are almost treeless. Round brick towers are built at intervals all the way along the tops, either for watch-towers or windmills, and the remains of the very fine aqueduct built in the eighteenth century are seen in many places. Small villages are passed, with flat-topped houses, decorated in many instances with bright glazed tiles on the walls.

The wild and cultivated flowers are very brightly coloured. The fields of borage were especially noticeable, with its vivid blue open flowers and magenta buds. The hedges along the roadside are mostly of agave or Mexican aloe, which forms a very strong and prickly fence, and is used for fibre to make cord and sacking. Some of the plants were completely covered with snails.

Beyond the hills, before the short range of mountains (Serra da Cintra) is reached, the country is mostly an undulating plain of heath and gorse. The mountains rise very abruptly from this plain, but their triple top had been obscured all that morning by cloud. As we climbed up the steep road to the town of Cintra, we rounded the northern end of the range, and found that the whole of the western side is clothed with most luxuriant vegetation, demonstrating the effect of the warm Atlantic breezes which blow up the slopes in clouds of condensing moisture. We were very unlucky to come in for a cloudy day on the mountains, and after lunch we were enveloped in a white mist, very warm and oppressive. Everything was saturated, and the scent from the numerous eucalyptus trees was almost suffocating, and of course we lost the wonderful view from the Castle of Pena. One rather remarkable fact, I think, showing the great humidity here, is that the grey lichen (old man's beard) grows several inches long on every plant with anything like a woody stem, even on the rose stems.

Before the clouds came up we had visited the beautiful garden of Montserrate, near Cintra, now owned by Sir Frederick Cook. Here are cultivated very large quantities of Australian and sub-tropical plants. Beautiful trees and flowers, grouped in masses by the side of the cascade, which falls by successive leaps from the top to the bottom of the garden ; rhododendrons and other flowering shrubs, creepers, clinging to arches and trellis-work, all a wealth of blossom. Several agaves were in flower, and were wonderfully picturesque when seen against the blue sky and the pale green of the plain (Fig. 6).

The royal palaces of Cintra and Pena are now kept only as show places. In the rooms of Pena are still to be seen the illustrated papers left by the Royal Family on their flight in 1910. This castle is on the top of the mountain, and is reached by steep winding roads, bordered by eucalyptus trees. The rocks are of pink granite, weathered into huge rounded boulders, and the stone is so rotten in places that it is like sand, and is quarried away in short tunnels to be used as the top dressing of garden paths. As we returned from the castle we descended very rapidly down to the plain, and were soon below the cloud level and again in the bright sunlight. The way we next went was south-west over a terribly bad road, full of huge holes, which the cars had considerable difficulty in avoiding. The country had the same treeless, wind-swept appearance right up to the top of the low hills, over which we dropped to the Atlantic shore at Mont' Estoril, a seaside resort for the inhabitants of Lisbon. The town is half encircled by the hills of yellow-white rock, and is very bright, with quantities of flowers in the gardens and hanging from the verandahs and terraces. The return to the ship after tea was along the bank of the Tagus, past the tower of Vasco da Gama, the old cathedral of Belem, and through the ' Black horse '' square or Praça do Commercio, to our quay, reaching the boat at six p.m. Coming back by this road, one realises how abruptly the hills on which the city stands become steep and how close the high ground comes to the water's edge.

On Friday our three days' stay at Lisbon came to an end—three days of hot, bright sunshine. We left punctually at 7 p.m., steaming down the river as the sun sank behind the purple mountains, on which is situated the Castle of Pena, and on this occasion they were clear cut against the golden west. Crossing the bar, we were once more out in the Atlantic, shaping a straight course for Madeira. The first night we ran through a dense fog-bank, which must have extended right up the coast of Portugal and France, and also up the English Channel to Dover, for it was at this time that the disaster to the "Egypt" occurred in the Bay of Biscay. As we were steaming away from land, we got into clear weather, after a few hours of careful navigation, and by the next afternoon were experiencing the great Atlantic rollers.

A fly-catcher and a yellow wagtail accompanied the boat all the way to Madeira. Someone brought on board a "Lisbon canary," a large species of brown-coloured cricket, which the Portuguese catch and put in a tiny cage, where it chirrups incessantly all night. Flying fish were seen on this part of the voyage, and later on between Madeira and the Canary Islands.

The appearance of Funchal on that early Monday morning, as the ship anchored in the roadstead, was one of luxuriant beauty. The blue sea ran in little white foam-crested waves up the steep, black shingle beach curving in front of the city of white and grey houses, dominated by the square tower of the cathedral. The whole is surrounded by an amphitheatre of verdure-clad mountains, rising to 4,000 and 5,000 feet, studded over their lower slopes with white quintas or country houses, whose flower-decked gardens are a wonderful sight. (Fig. 7).

The public garden has fine tree-ferns and palms, and in the square are two rows of jacaranda, which were then a mass of blue-violet flowers without leaves. The streets of the city are narrow and paved with very small cobbles, over which the runners of the bullock-carriages and so-called carts slide and slither (Fig. 9). The wheeled traffic now consists of motor cars, which can mount some of the steep roads. We had one to the Monte Hotel, just below the church, which is the chief excursion for a day ashore. The road goes up steeply at the side of one of the large ravines, which converge round Funchal. Wherever the basalt is exposed along this road and in the garden at the top, it weathers spheroidally, and the lava flow has the appearance of having been deposited in heaps of gigantic balls, instead of in one continuous layer. The shaping is due to the manner of cooling and subsequent erosion. There are great layers of tuffs, brown and red, both above and below the lava flows, and as soon as they become unprotected they are rapidly washed away by the torrential rain. In Madeira the valleys are enormous, when taken in relation to the size of the island. The greater part of the island is formed of volcanic rocks ; only in the north, in Sâo Vincente valley and in the east near Canical, are Miocene fossils found, and it is probable that many of the so-called vegetable remains at Canical are tubes of hardened sand, similar to those now forming on the east coast of Gibraltar and those found in the Nubian (cretaceous) sandstone near the Second Cataract.

The church on the Monte was built about 1470 ; it is 1,965 feet above the sea, and there is a fine view from the towers. The return journey from the Monte Hotel is made by carros or toboggans, like wicker-chairs, on wooden runners, shod with steel. They are guided by two men, running behind, holding ropes. The pace often becomes very fast, and it is most exciting, as the roadway is the public road, very steep and narrow, for the most part, between high stone walls, and finally the run ends amongst the houses of the city (Fig. 8). The surface of the road is made of small basalt cobbles, set in semi-circular ridges, the axes of which are in a direction across the road, and the width of each half-circle is such that the toboggan-runners can span three of them at a time. As one would expect, the stones become polished and very slippery. There are many such roads in Madeira, and the peasantry bring their produce into the city on sledges. The curiosities to be bought are numerous. The wicker work, in the form of chairs and tables, is very nice, but these articles are too cumbersome to buy, unless sent home by cargo boat. The embroidery is more like "broderie anglaise " and satin stitch, and is quite different from the Teneriffe drawn-thread work. The inlaid woodwork is very pretty, the til wood has a lovely grain, but care is required in using the walking sticks, as the wood easily snaps.

Between Madeira and the Canary Islands the only land sighted is that of the Salvage Islands, three small barren islands of volcanic origin. Two are only sand-spits, but the third is slightly larger and has steep cliffs with a pyramidal hill on top. There is some vegetation on the northern side, but no trees. The Peak of Teneriffe can be seen before reaching Las Palmas, the chief port of Grand Canary, but we were unlucky in having cloudy weather. The islands—nine in number—which go to form the Canary Archipelago are composed almost entirely of volcanic rocks of Tertiary age to the present time. On Grand Canary itself there are some beds of limestone, and there is evidence of raised beaches of Pleistocene Age on the east coast. The sea around is of very great depth, especially off the coast of Teneriffe, and harbours are on this account difficult to construct. The steamer calls at two of the islands, Grand Canary and Teneriffe.

Grand Canary—an almost circular island—is mainly formed of volcanic rocks, but some limestone occurs, as that near Telde, and other aqueous formations are the raised beaches of Pleistocene and the conglomerate of possible Miocene Age. The highest point is in the centre of the island, Pico Los Ponchos, 6,400 feet, and the whole island is deeply scored with precipitous ravines or barrancos of great extent, the Barrancos de Tijeda and de Tirajana being the two longest. To the oldest volcanic period belong the basalts on the north-west and west side of the island, followed by more acid eruptions of trachyte and phonolite, with thick bedded tuffs and the possible formation of the thick conglomerates of the Miocene terrace on the north of the island. During the third volcanic period the great valleys were begun, and the latest period produced the younger lavas, consisting of dark-coloured basalts, tuffs and lapilli. These rocks are found in Isleta, the small peninsula north of Las Palmas, and along the eastern side of the island. Isleta is joined to the main island by the narrow isthmus de Guanarteme, only a few feet above sea level and formed mostly of sand. The port of Las Palmas, Puerto de la Luz, is situated on the east side of this isthmus under the shelter of the hills of Isleta, about four miles from the city. The north of the island has precipitous cliffs intersected by deep valleys. The cliffs extend at an average height of 600 ft. across the southern end of the isthmus, and it is against this portion of the cliff that a huge sand-dune has been banked up ; its lower end reaches nearly to the port, and its highest attains the height of some 200 feet. The sand is composed partly of round quartz grains of Sahara sand, blown across from Africa, which is about 200 miles away, and partly of local material, black igneous rock and comminuted snail shell. The curve of the barchans points to the fact that the strongest prevailing wind comes from the north-west. The dune is most beautifully and intricately ripple-marked, and by taking a zig-zag line from the south-west point I managed to walk across it fairly easily. The eastern side is so very steep that I slid very quickly down, much to the amusement of certain of the inhabitants. Boraginacea grows on the west side in the sand.

The direction and strength of the wind are emphasised by the slope and growth of the trees. Some of the eucalypti bordering the roads are almost sloped across from one side of the roadway to the other (Fig. 14). All this northern part of the island is a desert except where small patches have been irrigated. Prickly pear grows on the hills, and corn and bananas are cultivated where possible in the valleys. Very interesting wild desert plants are found. Mesembryanthenum crystallinum is covered with little shining globules containing water so full that I had to throw away the larger piece

I had picked, for on being slightly crushed it saturated part of my bag. It is burnt for potash.

Great S-curving valleys (Figs. 11 and 13) have been excavated in a series of lavas and tuffs. The chief lava flow is of dark andesitic rock, full of vesicles, containing calcite and olivine. It has a thin bedded appearance in situ (Fig. 12), and below it is a very thick deposit of fine tuff, which is easily washed away as soon as the lava is broken through. Above the lava are some coarse tuffs, very much wind eroded (Fig. 10), but most of the high ground seen in the illustrations is of a conglomerate of irregularly eroded pieces of calcareous material of sizes varying from a pea to a boulder, dreikanters of local igneous rock, and other shaped pebbles, which have while still in the matrix of the conglomerate a polish, sometimes resembling the green coating of the bull-head flints, sometimes a dull brown, and at others a bright green staining. It has been said that this conglomerate is of Miocene age, possibly a raised beach. The composition, the height above the present sea level, and the fact that the pebbles usually lie in a position with their longer axis vertical, seem to point towards a sub-aeolian or semi-desert origin. The illustrations were taken at the highest point on the road to Tamaraceite, at an elevation of roughly 600 feet. Another point of interest connected with these photos is that they were taken after three p.m. at the end of May as snap-shots with a No. 3 Kodak, stop F.8. time, 1-25, when the sky was completely and thickly overcast and the rocks mostly grey and black. It proves what an amount of actinic light there must be around the coast.

In nearly every one of the numerous small quarries I found the remains of mules, from the complete animal to a few bones. I had noticed the hawks swooping round, but the number of dead animals was rather a surprise. I suppose the mules wander and fall over the unfenced holes.

On the long expedition taken to Telde, Atalaya and Monte (Figs. 14 and 15), the Pleistocene terrace, 80 to 100 ft. up on the eastern coast, was clearly seen. Bananas and tomatoes flourish between the cliffs and the present shore, and on passing through a tunnel in the cliffs the village of Jinama comes into sight. It is protected on one side by a wall of tuff and on the other by a wide lava stream These lava streams, of which several may be seen, are most interesting as they stand out clearly from the surrounding rocks and show all the special technical points of a flow. One very fine one is crossed by the road before entering the gorge below Atalaya. It is a huge mass of rough and tumbled scoriaceous lava, several feet high, quite black, with no vegetation on it, and it can be followed a long way down as it stands up bare amongst the cultivated fields. The Euphorbia Canariensis is one of the chief plants which are found growing on the lava here and in parts of Teneriffe.

In the broad valley, extending from the south-eastern slopes of Gran Caldera (Fig. 15), many orange trees are grown, and the best fruit comes from the groves on the west of Telde. The Gran Caldera de Bandama is one of the most perfect explosive craters known. The lip of the crater is an unbroken ring over a mile in diameter and 1,350 ft. above sea level ; the bottom has gradually subsided to 1,000 ft. below the crest. The Pico de Bandama, rising to a height of 1,840 ft., overlooks the crater, in which vines are cultivated.

Atalaya, the largest Canario troglodite village, is a little to the south-west, on the northern slopes of the Barranco de las Goteras. The barranco is seen in the distance, on the left in Fig. 15, and is very steep and narrow. The village, formerly a native stronghold, is situated in a small amphitheatre, 1,720 ft. above the sea. The houses are mostly caves dug-out in the hill-side, the tuff being very easily excavated. The inhabitants, who are small,

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are descendants of the aborigines, and are still an almost pure race, as their Spanish neighbours, for some reason, regard them unfavourably and rarely inter-marry with them. The chief industry of these people is the making of rough pottery (jars, flower-pots, and other utensils), the mode of manufacture being that of the original Canarios. The grey volcanic mud of the district is mixed with water and kneaded into the required form on a flat board by means of the hand and a small smooth stone. When the pot has been shaped it is smeared with a red ochre and rubbed with a stone. The rubbing brings the ochre to a glistening polish, as may be seen in Figs. 26 and 28, where an unfinished and a finished pot are seen on opposite pages. The first I saw made, and when given to me it was soft and very wet with the water thrown over it in the making. Unfortunately I squashed the handle, but two days after, thinking I might be able to pull it straight, I discovered the clay had set so hard that it was impossible to move it. It had not been subjected to any heat, but had stood on my cabin floor all the time wrapped in newspaper. The clay is very heavy, and only a little rubbing with the stone produces a polish on the ochre. The polishing stone (Fig. 27) is a very fine grained black basalt. It is smooth except for the innumerable fine scratches caused by the rubbing, and it also becomes worn into a shape similar to those smoothed pebbles which are so often found on prehistoric sites in Great Britain, and which were undoubtedly used for a similar purpose. I looked at stones belonging to other members of the family into whose cave-workshop I had penetrated, and with the exception of a very slight difference of shape, they were all alike. The woman I had tackled on the subject (by signs as we could not speak each other's language) let me buy hers for sixpence, and I gave her for the pots and the demonstration two shillings, with which she seemed quite content. Unfortunately, one has so little time to make investigation, and on this occasion a tremendous rainstorm came on, lasting for the next three hours.

Farther in the interior some of the mountains are covered with groves of walnuts, sweet chestnuts, and pines. At Los Pusitos an enormous chestnut tree stands near the road. It is not very high, but its bulk cannot fail to attract the eye, measuring as it does 25ft. 7in. around the trunk. The upper part of the road from Monte to Las Palmas is bordered with eucalpyti of various species, and fields, protected by aloe or agave hedges, slope down the side of the barranco (Fig. 14). Vines, from which are made the best red wine of the country, have been grown up there since the beginning of the eighteenth century, when the barren waste of igneous rocks was first cultivated. Nearer Las Palmas the country becomes more and more arid, and it is only by irrigation that any vegetation is made to grow.

The city of Las Palmas is composed mostly of low houses with flat roofs, giving it a very eastern appearance. There are some old churches containing good carving but the cathedral was rebuilt in 1781, of "blue stone," the basalt obtained from quarries at Atalaya. The treasury contains some fine pieces of church plate and vestments, some of which are said to have belonged to old St. Paul's Cathedral in London, and were sold during the Commonwealth, as also was some of the church property now in the cathedral at Santa Cruz, Teneriffe. We were fortunate in seeing one of the monthly processions of the clergy of the diocese. The priests were arrayed in purple and gold vestments, and the acolytes carried small canopies of the same material, and large candles.

Curios for sale are brought round the ship in small boats, and include goods from various countries, especially India; parrots, canaries, monkeys, and little dogs. Florida water and cigars, local and Havanna, are also sold. Cigars are made in Las Palmas from tobacco brought from the West Indies, but of recent years it has been found possible to grow good tobacco on La Palma, the most westerly island of the group.

Our boat brought to the islands, amongst other cargo, bales of fibre for bedding the mules and horses, to make suitable manure for the vines. Mules and oxen are used as draught animals; mules, donkeys, and horses for riding. Motor cars are now much used, but quaint little two-wheeled carriages, surmounted by a four-post awning, and drawn by ponies, also ply for hire. The women in this island wear white woollen mantillas on Sunday, otherwise the dress is quite ordinary.

Teneriffe was, to me, the more beautiful and fascinating of the two islands, and the climate of Santa Cruz seemed to be more invigorating. The shape of the island has been likened to a shoulder of mutton. It is entirely composed of igneous rocks, erupted during three different periods, beginning in early Tertiary times. To the oldest and first period belong the basalts, tuffs and phonolites of the Anaga mountains (Figs. 16, 18, 25) in the north and the Teno district, in the extreme west, besides a few isolated patches in the south. The second eruptions spread all over the island, between Anaga and Teno, and formed mountains of lava flows, especially in the southern part of the island. On the top of these mountains, to the north-west, began the outpourings of lava of the last volcanic period, and the subsequent building up of the Pico de Teide (Hell), the familiar Peak of Teneriffe, 12,152 ft., within the enclosed plain of the Cañadas, the earlier crater, which is in the same relation to the Peak as Monte Somma is to Vesuvius. Streams of lava flowed down from the mountain sides in all directions. Basalts and phonolites filled up the valley between the Anaga Mountains and the mountains of the second period, and formed the elevated plain on which La Laguna, 1,714 ft., stands. (The onions are on the edge of this plain in Fig. 18). The rocks of the ring of mountains round the Cañadas are very various, but those of the Peak and the Cañadas plain are pumice, obsidian, trachyte, and some phonolite. The latest lavas are also of an acid type, including syenite, sanidinite, and aegerine foyaite, and are found in broad belts west and east of the Peak. There is still volcanic activity in solfatara stage and an occasional outburst of lava from the parasitic cones on the north-west slopes below the Peak. Very many of these cones were built up by eruptions during the eighteenth century, and still stand out in clearly defined characteristic shapes. A great explosion near Guimar formed the narrow gorge called Garganta de Guimar, at the lower end of which the little volcano Arafo was active as late as 1705. The last lava flow was in 1911 from a crater on the north-west of the Peak, and reached as far as the cliffs to the west of Garachico, a small fishing village about 30 miles from Puerto Orbtava. The cliffs are quite bare, with a black and blue-grey scoriaceous lava tumbled over them. The beach of the small cove is of very tiny oval pebbles of the lava. All along the coast road between Garachico and Orotava the difference between the rocks of the second and third period is most conspicuously marked. The earlier form the high precipitous cliffs, standing out like bastions, with here and there a waterfall leaping down, whilst the latter are broad flows often with a rough upper surface, spread out between the high cliffs, and are themselves eroded into deep steep-sided gorges down to sea level.

The Anaga mountains, being of the oldest formation, and apparently never having been covered by any subsequent eruption, are much dissected by erosion. The water-shed, in nearly an east and west direction, rises to heights from 2 to 3,000 feet. From it long narrow spurs branch out north and south, while between them deep precipitous barrancos descend to sea-level. The spurs are very irregular in outline (Fig. 16, 25), rising in pyramidal hills all along their tops, and usually ending in a steeply curved slope towards the sea on the south (Fig. 17), except at the Semaphore (700 ft.) (Fig. 19) about 8 miles north-east of Santa Cruz, where there is a vertical cliff composed of lava and bands of bright red or yellow tuffs. On the north, low vertical cliffs end the long sloping spurs. The Anaga Rocks are two small barren islands close to the north coast, rising sheer out of the sea. The nearest can be reached from the shore by land at low tide, but the depth of the sea is so great between the two that the ship can easily go between them.

I made an expedition by myself up a tributary to the Barranco de Ameida to the north of Santa Cruz. Wherever possible the whole mountain side is formed into terraces, sometimes above the 2,000 feet contour (Fig. 18), as is seen in the view taken near La Laguna at 1,000 feet above Santa Cruz. As the height increases so the vegetation changes (Fig. 23). At the bottom bananas were growing, further up vines and tomatoes had flourished, but when I was there the plants had been up-rooted. Keeping in the almost dry water course, amongst boulders of igneous rocks, I walked up-stream and climbed up where a dam had been built across the valley to form a small reservoir (Fig. 21). Over the water crimson dragon-flies sported and yellow wagtails fluttered, whilst large grey lizards scuttled away amongst the rocks.

The section on the right-hand side showed a wonderful series of rocks, tuffs alternating with basic lava flows. Large caverns occur in the under surface of the lava, and are due to the continued flow of part of the molten mass after the upper crust has crystallised. These caverns are found in several parts of the island. The most famous is the large cave at Icod de los Vinos, which the Guanches, the aborigines of Teneriffe used as a place of burial. The present inhabitants find them useful for stabling their animals. Two goats were lying in this one, and further up I found several pig-sties. The tuff is also very easily excavated, and the lava, when not jointed, is impervious to water, so sometimes farmhouse, pig-sty and fowl-house are all conveniently situated under one lava flow (Fig. 20). In Fig. 20 are also seen some of the local plants, a small Kleinia nereifolia is starting in the forefront, and from the top of each flow grows Euphorbia canariensis, like pale green square-shaped candelabras. The Euphorbia is very poisonous, but I collected Plocama pendula, a very pretty drooping shrub, with small pale yellow flowers, Lavandula multifida; Nicotiana glauca, standing tall and erect amongst the boulders of the gullies, with yellow upright trumpet-shaped flowers, and a pinky-grey section of a Kleinia. This latter, after being picked (May 25th) and kept two months in a box, produced green leaves at the apex. On August 9th I stuck the end in some damp earth in a pot, and it is still flourishing (Sept. 20th), only having had a very small quantity of water.

Walking amongst the gullies, one is able to realise the enormous amount of denudation that has taken place. The first rocks were erupted not earlier than the Eocene and probably in Oligocene times. Flow after flow of lava, one upon another or upon interstratified beds of tuff, was poured out from craters, which have long since disappeared, until they formed a high mountain range. This has been denuded to an average height of 2,000 feet, and intersected by innumerable ramifying ravines down to sea level. There is a particularly well-marked bright red layer of tuff, with inclusions of angular pieces of igneous rock, which I was able to trace across several of the branches of the barranco up which I had been walking, and I saw it again in the Semaphore headland eight miles away (Fig. 19).

Villages and many houses are perched high up on the mountains. There are only two or three roads fit for wheel traffic, but most of them are only roughly cobbled trackways (Fig. 22) up which everything must be carried by pack animals. Small donkeys are the most usual means of transport, but camels are also used all over the island. On the better roads and in the towns, bullocks, mules, and some horses are the draught animals.

Santa Cruz is a clean, bright city, with white flat-topped houses. It is the military centre of the province. Smart Spanish soldiers are much in evidence, and several forts guard the harbour, and in the cathedral are preserved the two flags from Nelson's ship, captured in the naval engagement in 1797.

It is here and at La Laguna that one sees the peculiar dress worn by the peasants of this district. The men have leggings, coloured waistcoats, white knickerbockers, and black woollen saddle-protectors, and a most effective overcoat, the manta, an English blanket folded and gathered into a leather collar. The distinctive part of the women's dress is the curious little "pork-pie" hat on which they balance their baskets and milk-cans.

There are many picturesque buildings in the islands, due largely to the use of wood in their decoration. The beautiful balconies, windows, patios and galleries are very attractive. The University of San Fernando at La Laguna (Fig. 24) has two balconies facing the street on either side of the tower of severely plain architecture. The oldest church, Iglesia de la Concepcion (1511) in this city, which is the seat of the bishopric of Teneriffe, has some wonderful carving. The interior, with its many altars and reredos is almost entirely of wood, and the pulpit is very fine. Carved balconies can be seen adorning the windows in the street at Puerto Orotava (Fig. 29). Nearly all the windows of dwelling houses have balconies or wooden shutters which open, slanting outwards at the bottom, and behind which, as one passes down the street, one sees shining dark eyes peeping, whilst the owner of them is hidden in the shadow, and it gives one the feeling of having returned to the romantic days of the troubadours.

The sea at Puerto Orotava is extremely deep, and it has been impossible to build a harbour for the steamers. They can, however, come quite close to the shore on account of this depth, unless there are storms, when the waves come rolling in with too great force to allow the row-boats to come alongside to transfer the cargo, which has then to be sent across the island in bullock carts to the protected harbour of Santa Cruz. I was particularly struck by the amount of wind we experienced round these islands. The first time we left Santa Cruz the wind was blowing directly at our boat, which was berthed at the end of the quay (Fig. 17), and was so strong that the tug was unable to pull us out, and we had to stay for four hours longer until the wind moderated.

I was much disappointed in not seeing the Peak, but the trade wind clouds, which on the north side of the island are formed at a height of 4,000 feet, completely obscured it all the day we were at Orotava. The atmosphere was very close and enervating, though the temperature was only 70 deg. F. We spent, however, a most interesting day ashore. First, at the botanical gardens (Fig. 30), in which all kinds of plants are grown experimentally. In the picture are seen, amongst others, sweet-peas surrounding the swans' pond; date palms from Africa are some of the tallest trees; tree-ferns from New Zealand are beginning to grow, and the indigenous dragon-tree sends up its many branches in the distance. Afterwards we went to another lovely garden (a wealth of flowers) at Villa (town) Orotava, in which is a large white marble tomb, once the grave of a noted Freemason, whose body was afterwards removed to Europe. The climbing geranium flourishes everywhere luxuriantly; some of the walled terraces were completely covered with the pale pink flowers. We had a picnic lunch under eucalyptus and maple trees on the banana plantation of Gorborana, belonging to Messrs. Yeoward Brothers.

The Banana is one of the staple exports of the Canary Islands at the present time. It can only be grown on land capable of irrigation and up to an altitude of 800 feet. The plantations are all of small fields mostly on terraces (Fig. 31). These terraces are formed by banking up the earth and walling it in with the rough blocks of igneous rock which are cleared off the land. The soil is sifted, and all the larger pieces taken away, leaving only a rubble of tuff and weathered lava, which is mixed with manure. A system of small channels are made over the plantation, through which water flows, and from which it is periodically turned into the fields. The plants in the Canaries are of a small species. They are cut down each year, and new suckers grow out of the old stumps. The bunches grow from the base of the leaves. Large madder-pink and brown bracts cover the small tubular yellow flowers, which grow in a half circle round the stalk under each bract. As the bunch gets older the bracts fall off and the fruit turns upwards to the light. The fruit is gathered green (there is no seed), and each bunch packed in a separate crate stuffed with dried banana leaves. The crates are then loaded into carts (Fig. 29) drawn by two or four oxen, or occasionally on to the pack-saddles of camels. At Las Palmas and Santa Cruz, where the steamers can come alongside the quay, the crates are hauled, ten at a time, directly on to the ship, but at Orotava they have to be taken out in large rowing boats, and transferred from these to the steamer. Great care has to be taken of the fruit. The first crates are deposited in the holds and arranged so that there are alley-ways between the piles, giving a perfect system of ventilation. As the load increases the cargo is placed on the decks, until the boat, with the exception of the promenade and boat decks, looks like some warehouse round Covent Garden market. Great canvas wind-sails are spread wide to catch the breeze and to direct it into the hold below, for if the temperature rises above 65 deg. F., the bananas would ripen too quickly, and would, therefore, not be fit for the market in England. The ss. "Alondra" brought home potatoes and tomatoes, packed in boxes, besides a very large quantity of bananas, but this did not rival the load of the s.s. "Ardeola," which had left Las Palmas the week before. Then the cargo numbered 35,000 crates, collected at the three ports. Quantities of Spanish onions are grown round La Laguna (Fig. 18), where the fields of pale grey-green heads of seeds are a wonderful sight.

The drawn-thread work, hair-pin work, silk scarves (Teneriffe and Spanish), calf-skin shoes, besides oriental materials, are the chief curiosities offered for sale.

On the voyage home deck-sports were much enjoyed by the passengers, while others read and rested. No land was seen between Las Palmas and the south-east point of Ireland—just one week. The ship the greater part of the time was too far away from land for the birds of the northern hemisphere to reach it. Some small black birds, between the Canaries and Madeira, and a gannet goose, off France, were the chief, until two carrier pigeons, competing in a race from France to England, settled exhausted on the boat. After that the gulls joined us, and followed us all the way up the Irish Sea.

Coming up this channel there was such a strong tide flowing with us for six hours that it increased the boat's speed by two and a half knots for that time. We noticed particularly the lengthening of the day as we came north. The first day after leaving Las Palmas was very hot and still, and there was a slight mirage, as though there was land to the west.

The following remarks may be of use :—Portuguese money (to be obtained on board) is required for making purchases and expenses on land, except the arranged trips in Portugal, but both in Madeira and in the Canary Islands English money is freely taken and liked on account of the exchange. Portuguese stamps are wanted for letters in Portugal and Madeira, and Spanish ones in the Canaries.

A short list of books :—

In Portugal. Aubrey Bell. The Bodley Head. 7/6.

Madeira, the Canary Islands, and the Azores. Sammler Brown. 6/-. Excellent and comprehensive.

Madeira. Yate Johnson.

In the Canaries with a Camera. M. D'Este. Methuen.

The Flowers and Gardens of Madeira. E. and F. Ducane.

The Canary Islands. E. & F. Ducane. Two of the series of Black's colour books. Are attractive, and help to identify the flowers.

Handbuch der regionalen Geologie. Volcanic Islands of the Middle Atlantic. A short geological paper, in German, with maps. Is very useful.

Regional Distribution of the Native Flora in Teneriffe. J. H. Salter, D.Sc. Manchester Memoirs. Vol. LXII. (1918), No. 8. Very interesting.

The Yeoward Line, Liverpool, publish a guide on the cruise, from which they have kindly given me the use of their route map.

If the prospective traveller is a botanist, and anywhere within easy reach of Kew Gardens, I would strongly advise a visit there. There is a very fine Euphorbia Canariensis in the succulent house and two or three small dragon trees in the temperate house, besides many other plants. Miss North, whose paintings are exhibited in a special museum, visited the islands, where she painted many of the flowers.

In conclusion, I should like also to express my gratitude to Mr. T. A. Sprague, F.L.S., of Kew Gardens, for so kindly naming my botanical specimens, and to Mr. T. W. Reader for so admirably photographing the Canario pots and polishing stone.

I.D. 1117. The Climate of the Eastern Mediterranean.

300 pp. + 5 maps in a pocket. 19 cm. x 12 cm. 5/-. H.M. Stationery Office. N.D.

This volume gives statistics intended to present in generalised form the average atmospheric conditions in the region of the Meriterranean east of Malta and thence to the Persian Gulf. Exhaustive tables of the results of meteorological observations are given for the Balkan Peninsula, the Ægean, Asia Minor, Cyprus, Syria and Palestine, Mesopotamia and the Persian Gulf, Lower Egypt and Sinai, Cyrenaica, Tripoli and Malta. There are also notes on aviation possibilities and difficulties, tables of mean pressures and temperatures computed for different altitudes, and an appendix of formulæ and conversion tables. The map gives the mean isobars for January, April, July, and October, and also the lines of magnetic variation for 1917.

NOTE.—The next of the Leplay House Tours abroad will take place at Christmas, when a visit of 15 days (19 days including journey to and from London) will be made to Rome. As in the case of previous tours organised from Leplay House, the visit will be given to a systematic view of civic and regional development. In the general course, which will no doubt attract the majority of members of the party, the development of Rome from the earliest to modern times will be followed with the assistance of expert guides. For those wishing to specialise on classical Rome, a series of visits devoted to that alone is being organised. Arrangements are also being made for another group to study Rome of to-day, with special reference to its educational, social, and political institutions. Further, a course of lectures on the development of Rome will be given during the tour. It will be seen that there is much in the visit to attract both human geographers and social students.

The party will leave London on 26th or 27th December, returning on 14th or 15th January. The arrangements are in the hands of Miss Margaret E. Tatton, to whom all enquiries should be addressed at Leplay House, 65, Belgrave Road, Victoria, S.W.1.

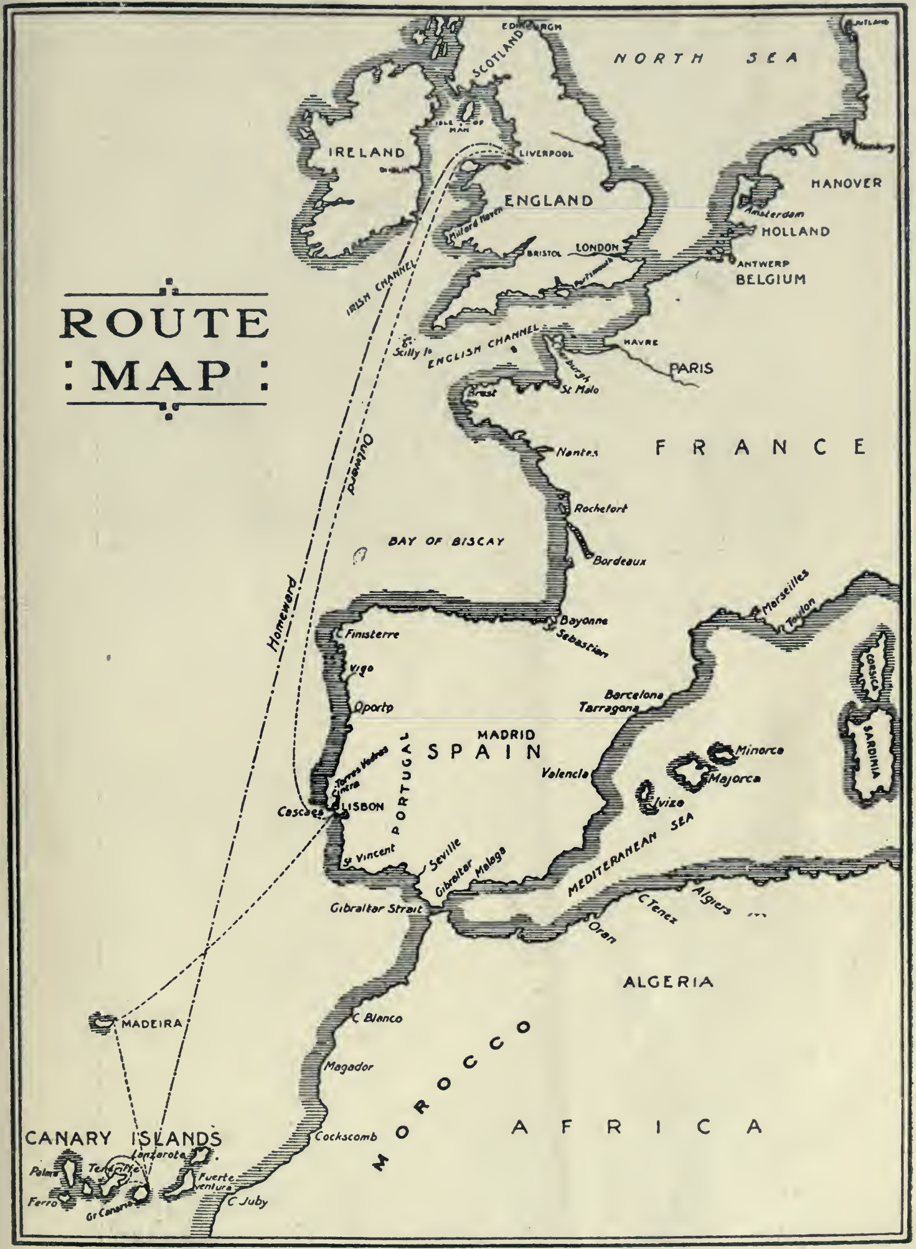

Fig. 1.—Map reproduced by kind permission of Messrs. Yeoward Brothers.

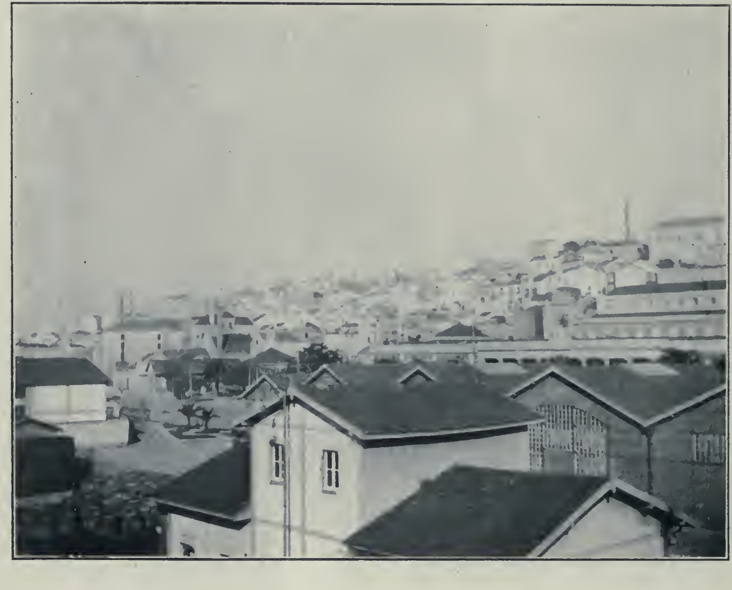

Fig. 2.—Panorama of Lisbon, East of the Centre of the City.

Fig. 3.—Lisbon Harbour, looking South.

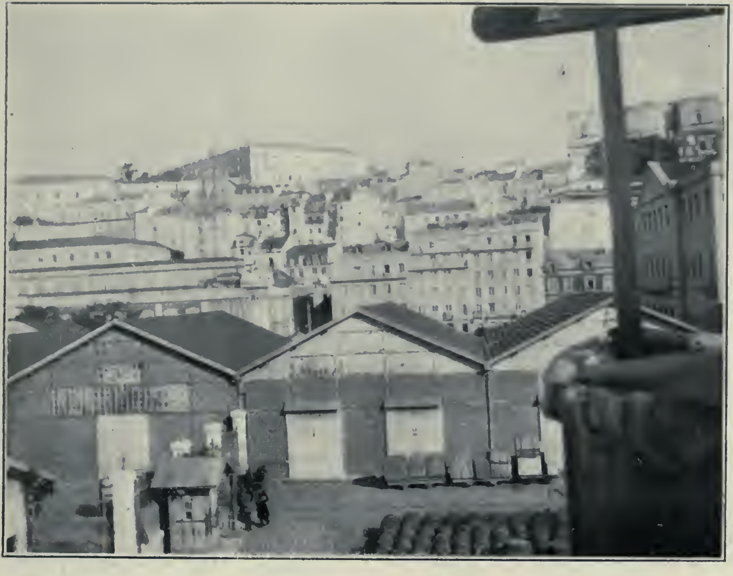

Fig. 4.—Panorama of Lisbon, East of the Centre of the City.

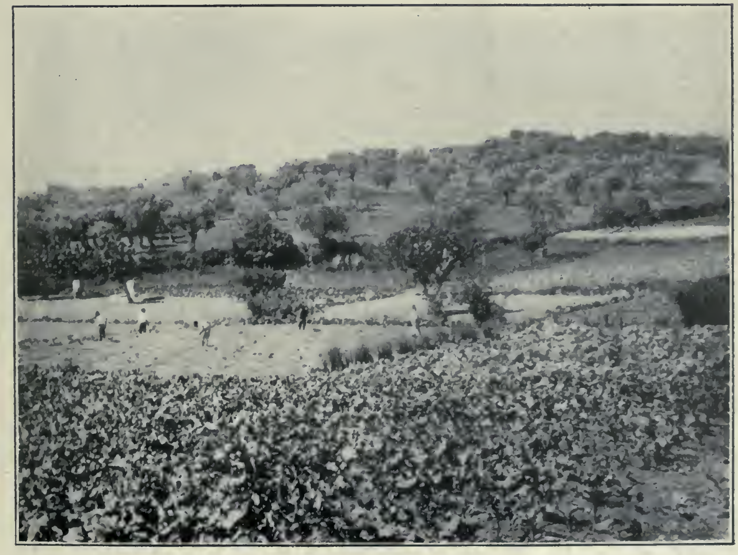

Fig. 5.—Oliveyards and Fields, East of Lisbon.

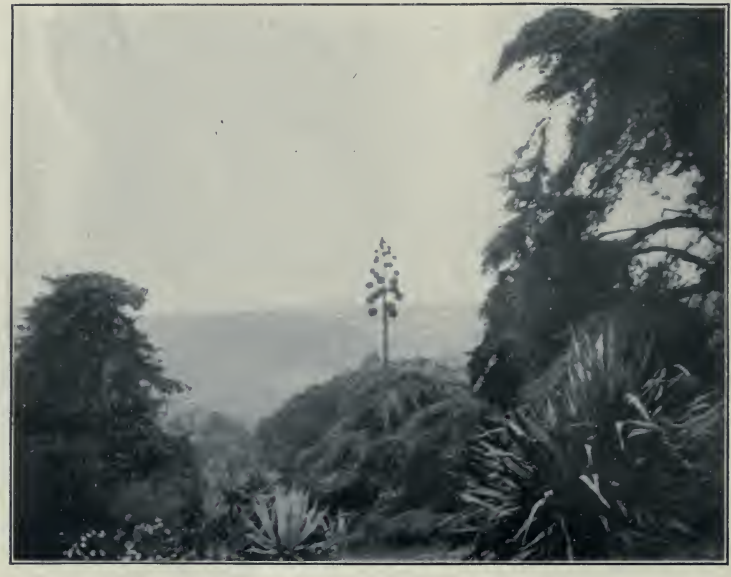

Fig. 6.—The Garden of Monserrate, near Cintra.

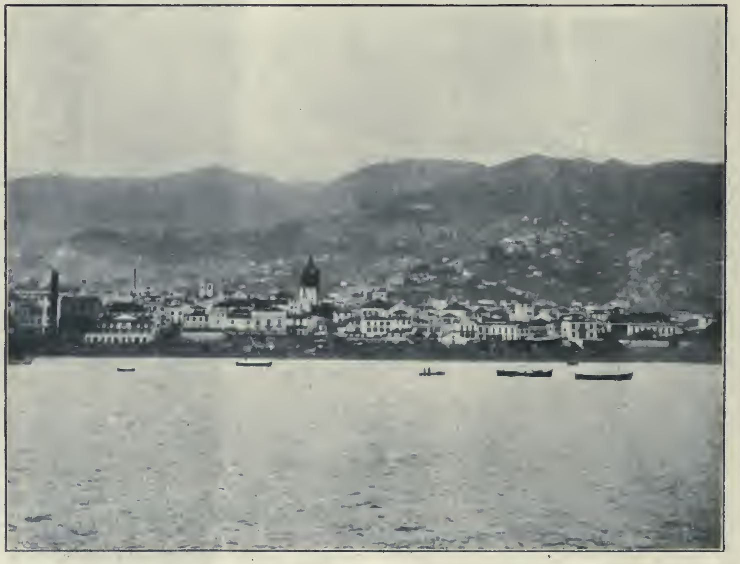

Fig. 7.—Funchal, Madeira, from the Sea.

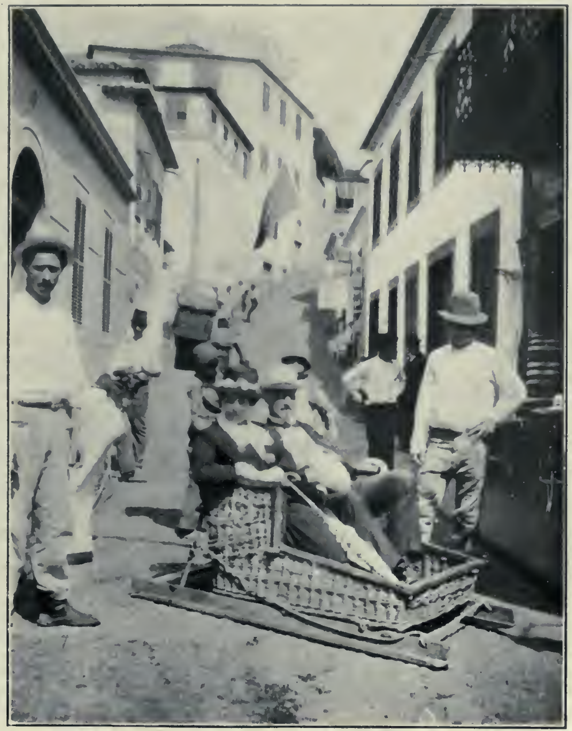

Fig. 8.—The End of the Toboggan Run, Funchal.

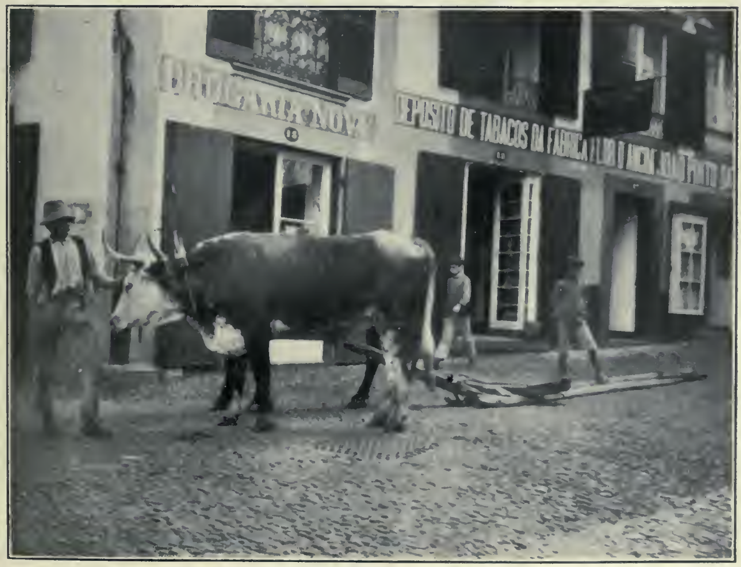

Fig. 9.—Bullock Sledge, Madeira.

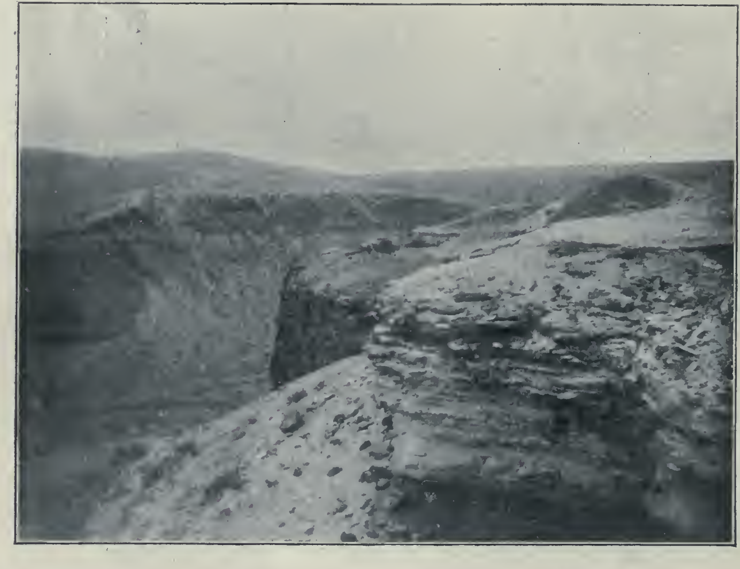

Fig. 10.—Eroded Tuffs, near Las Palmas, Grand Canary.

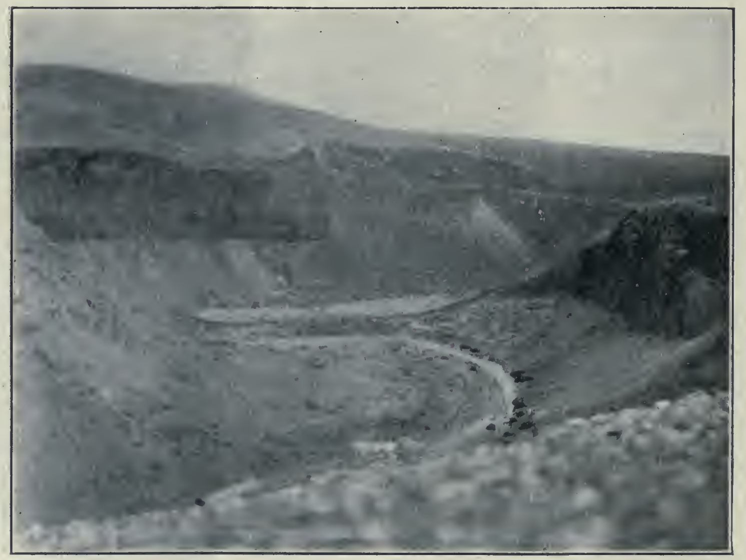

Fig. 11.—S-Curves in Barranco, North-West of Las Palmas.

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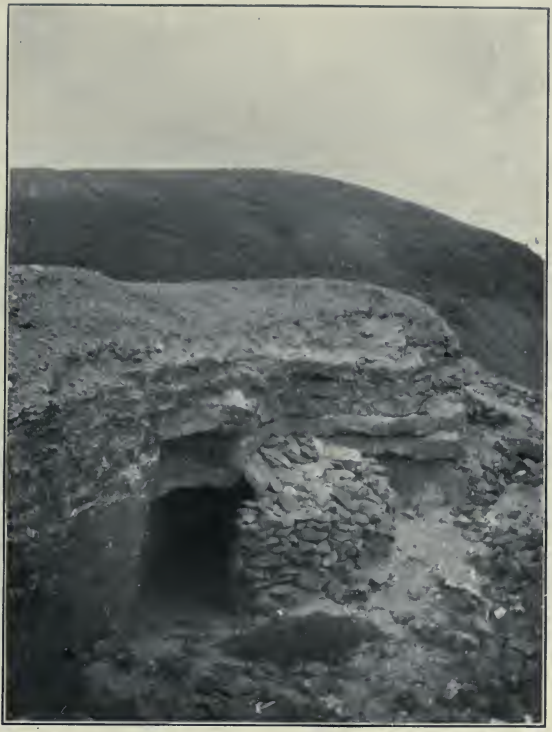

Fig. 12.—Andesitic Lava Quarry, North-West of Las Palmas.

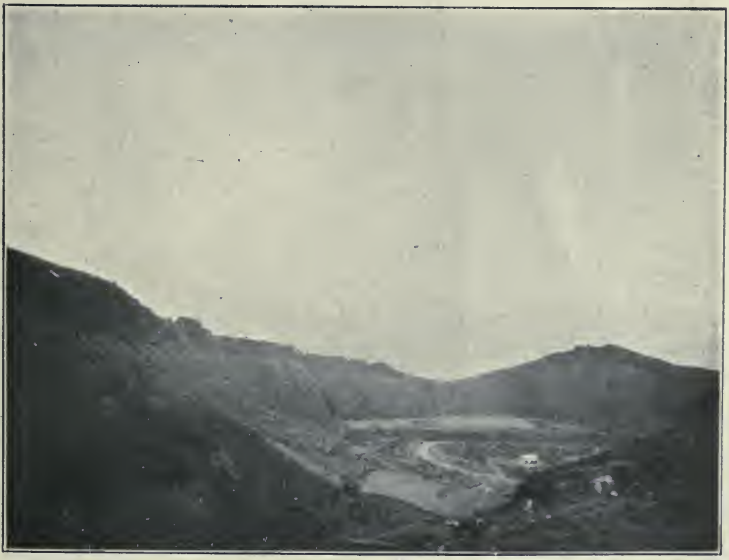

Fig. 13.—S-Curves in Barranco, North-West of Las Palmas.

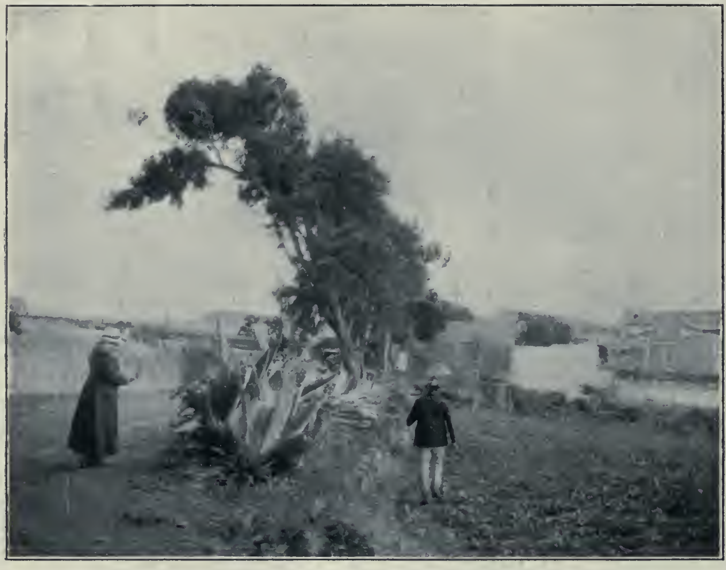

Fig. 14.—Eucalyptus and Agave at Monte.

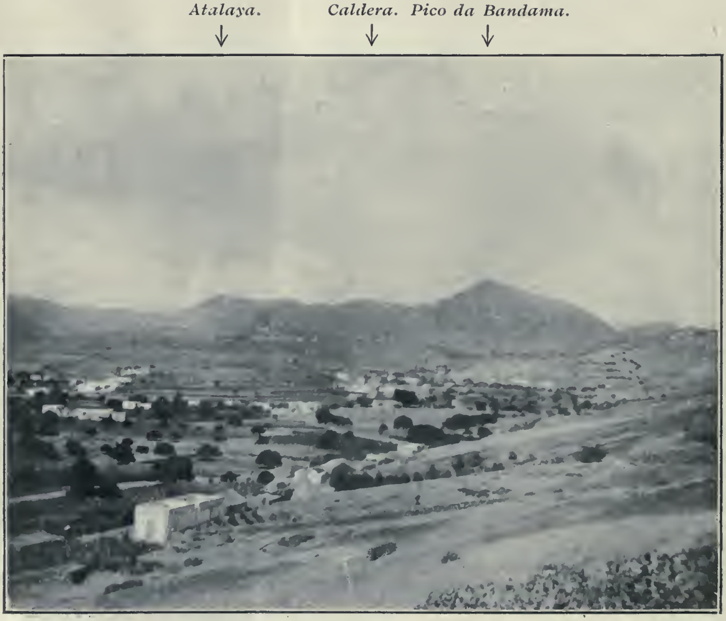

Fig. 15.—View from above Telde, Grand Canary.

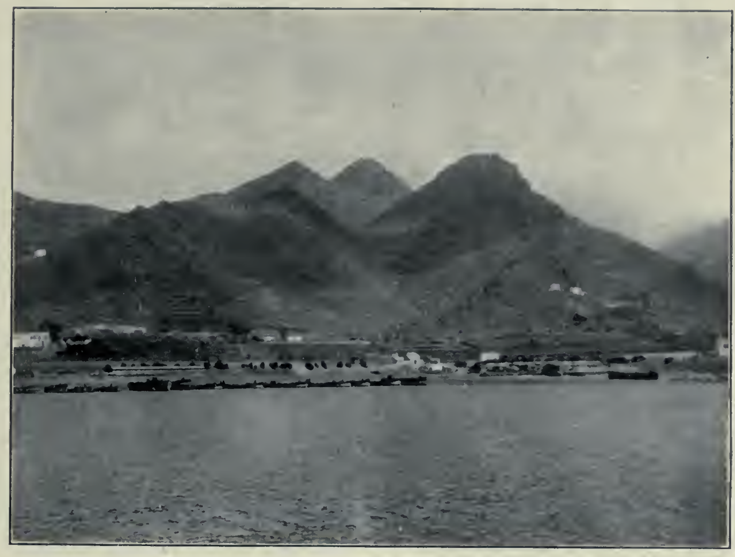

Fig. 16.—Anaga Mountains from Santa Cruz.

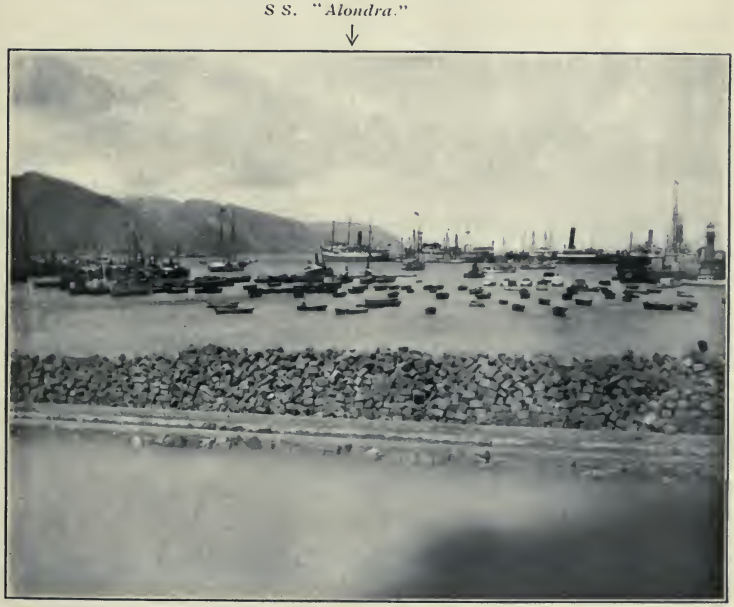

Fig. 17.—The Harbour of Santa Cruz, Teneriffe.

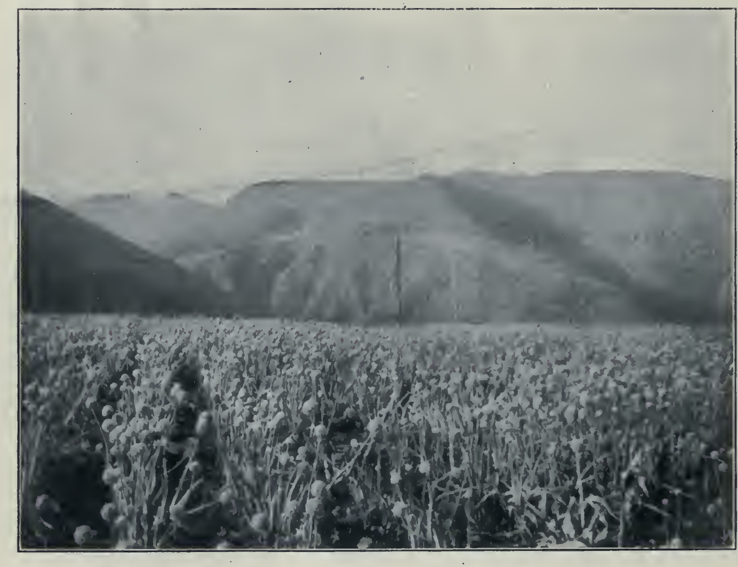

Fig. 18.—Onions, near La Laguna. Anaga Mountains in distance.

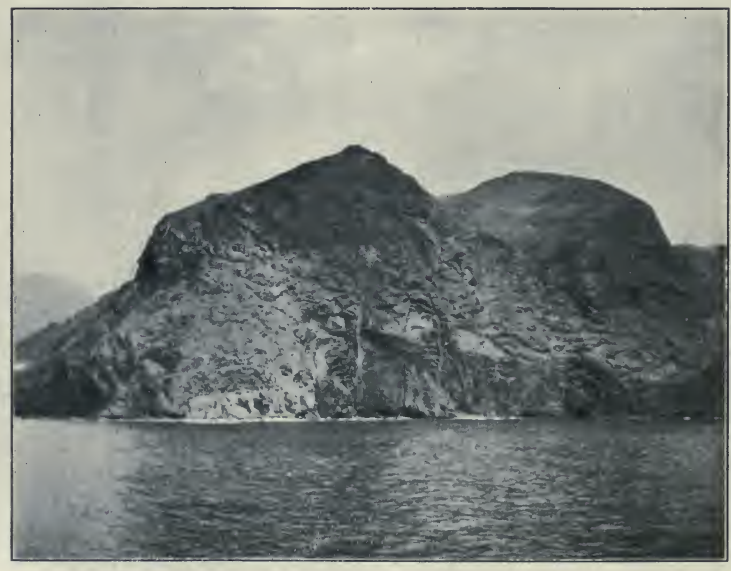

Fig. 19.—Semaphore Headland, East of Santa Cruz.

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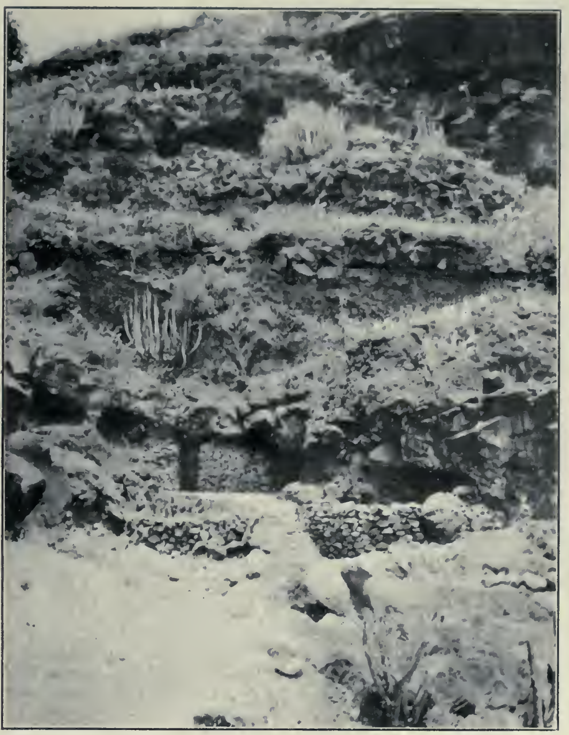

Fig. 20.—House and Pig-sty, under Lavas and Tuffs.

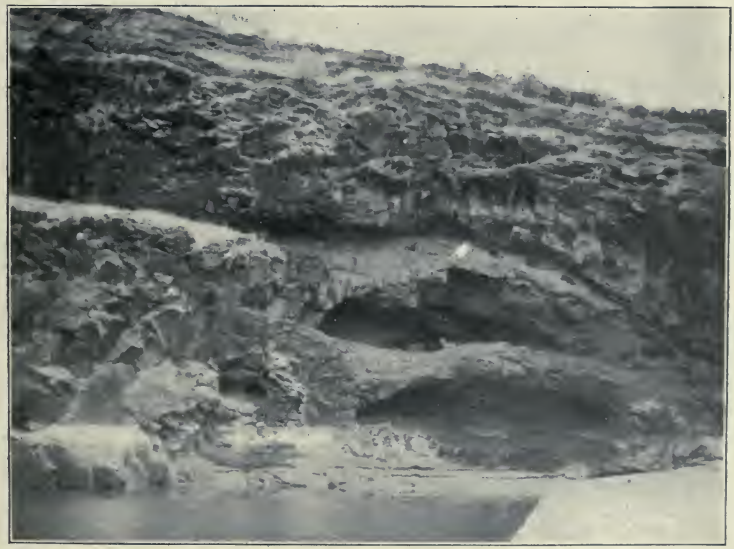

Fig. 21.—Lava Cavern, near Santa Cruz

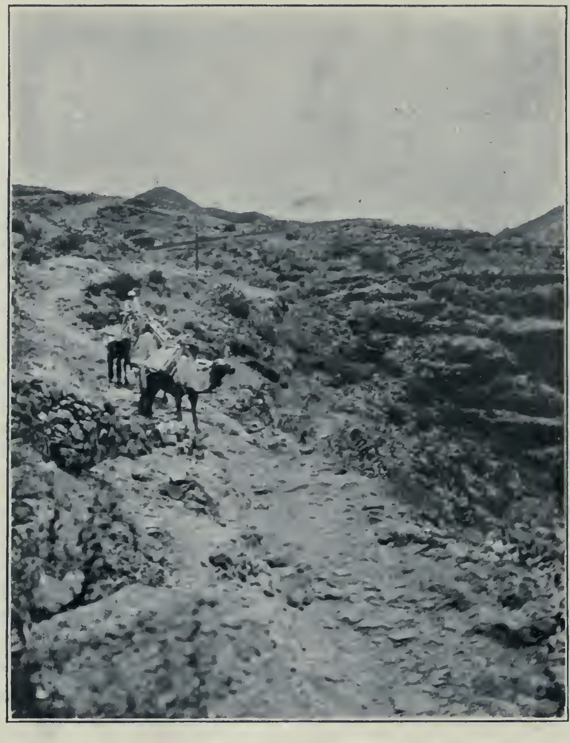

Fig. 22.—Camel Transport, Anaga Mountains.

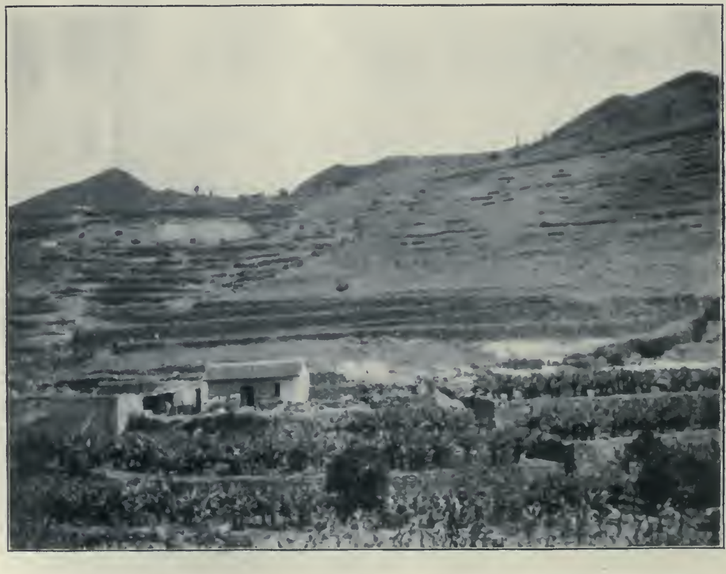

Fig. 23.—Cultivation Terraces, with Bananas in Foreground, North of Santa Cruz.

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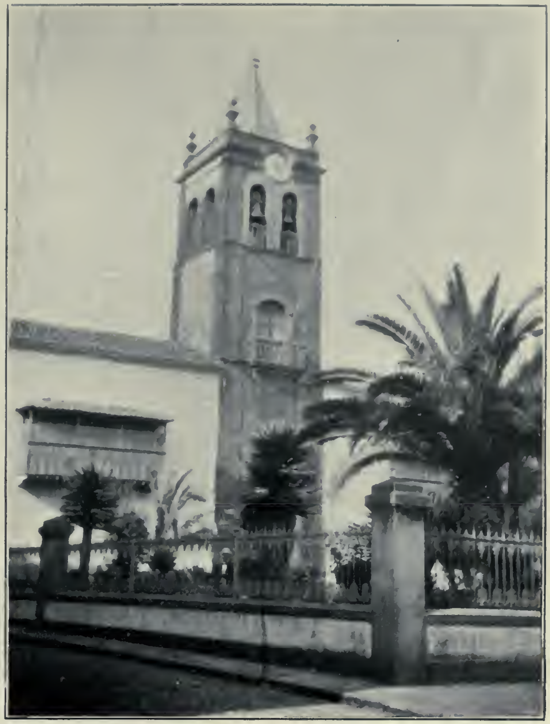

Fig. 24.—The College of San Fernando, La Laguna.

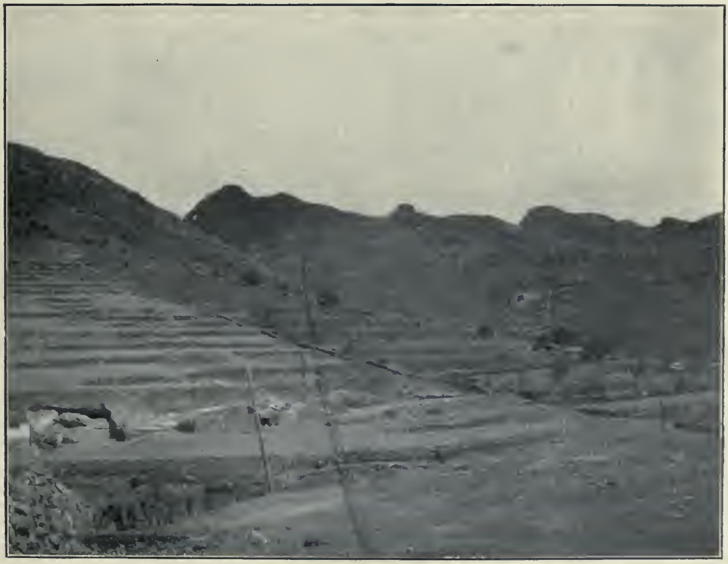

Fig. 25.—Cultivation Terraces, Anaga Mountains.

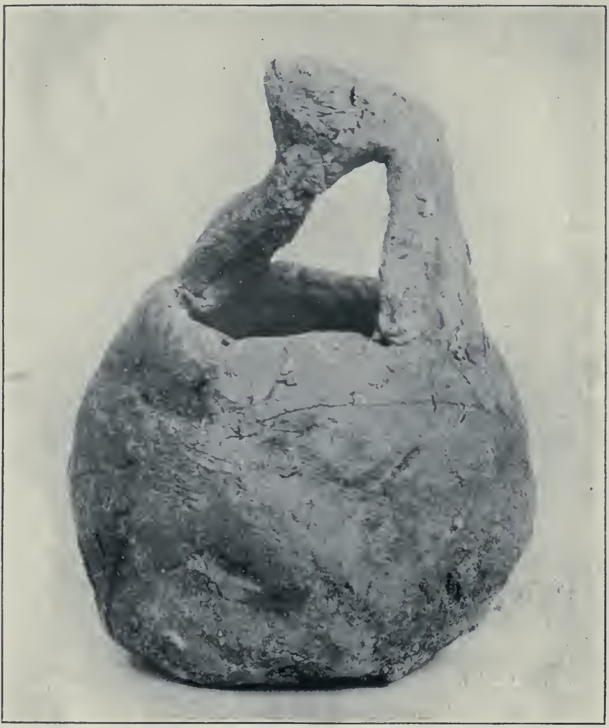

Fig. 26.—Canario Pot. Rough state.

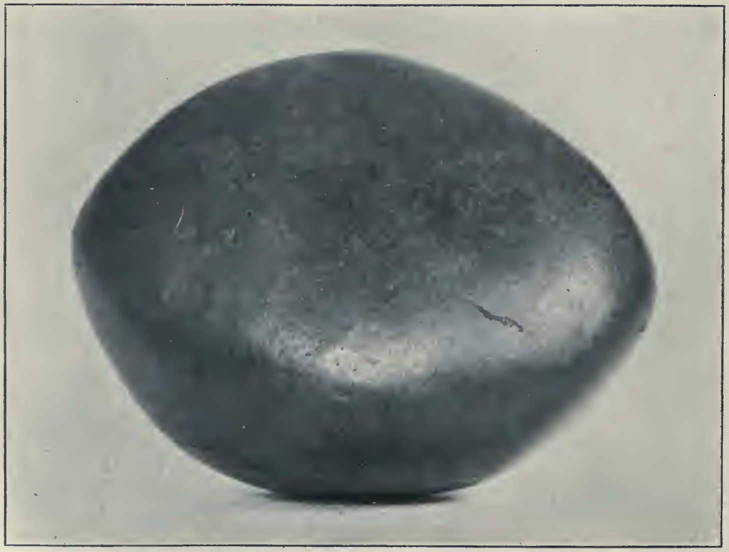

Fig. 27.—Polishing Stone. Slightly enlarged.

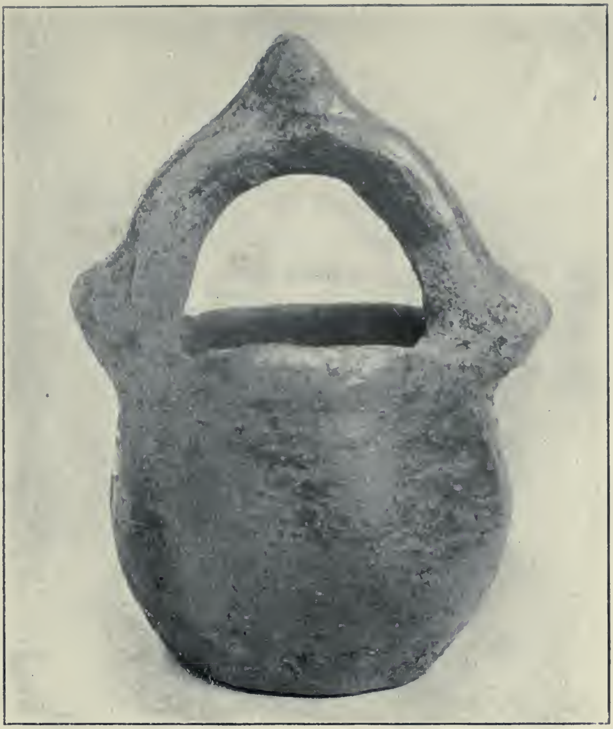

Fig. 28.—Canario Pot. Finished state.

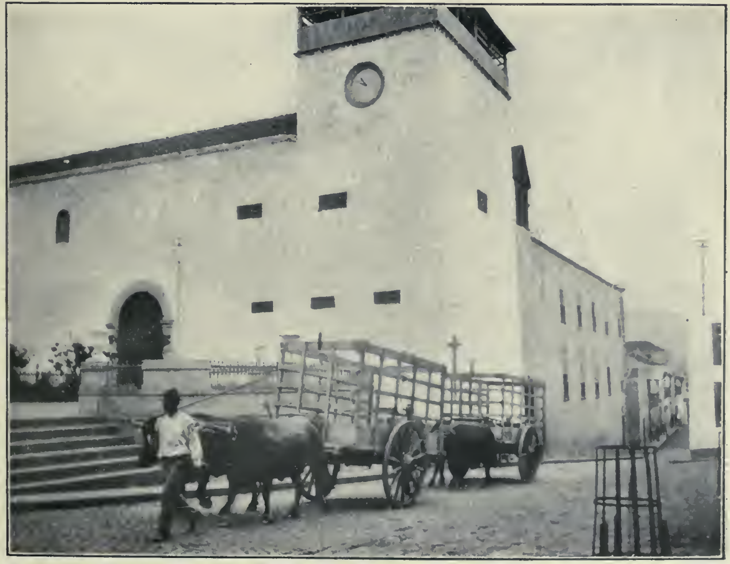

Fig. 29.—Banana Carts, Puerto Orotava.

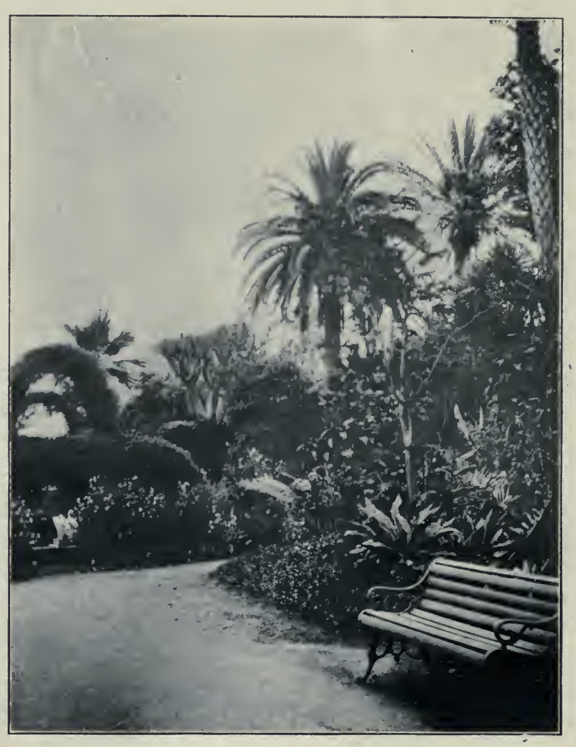

Fig. 30.—The Botanical Gardens, Orotava.

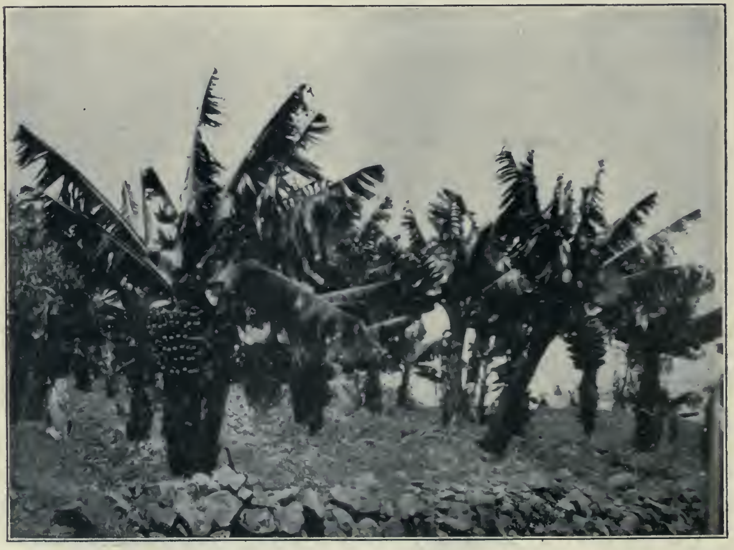

Fig. 31.—Bananas.

A Year's Course in a London Day Continuation School, based on the Local Geography.

1921—22.

M. H. MUNRO.

THE importance of geography in the curriculum of a day continuation school has been conceded from the first. Whether the bias of the school is vocational or non-vocational, this subject should take its place on the time-table. The problem of the teacher in constructing a suitable syllabus is one of great difficulty, owing to the varying capacities of the pupils, the differences in their previous training and present occupations, and the changing of the personnel of the class, owing to pupils often leaving the area when they change their work.

A systematic regional study of the world, which would be commenced about this age (14-15 years) in a secondary school, is not possible here in the time at one's disposal, and many pupils have not the necessary groundwork on which to base such a study.

In the " Report on the Teaching of English," it is stated that " local history adapted to the needs of the adolescent student should be studied not as an end in itself, but as an introduction to the history and literature of the nation." Similarly local geography should be studied, not as an end in itself, but as an introduction to world geography.

It is with this ideal in view that the following syllabus was framed. The school is situated in N. London, and the majority of pupils are employed by small local shopkeepers, in the transport trade in connection with the meat markets and railway termini, in needlework trades, laundry and domestic work, in small factories making " luxury " articles (beadwork, ornamental leather work, etc.). A number of pupils are employed in other parts of London, but resident in the school district.

There is no dominant industry, and this adds to the difficulty of selection of a syllabus with an economic bias. Greater London being a conglomeration of suburbs, having little acquaintance with one another, presents a difficulty to the teacher who wishes to begin locally. Is he to commence with the City and its ancient traditions or the immediate neighbourhood? If the latter offers any distinctive features, it is as well to begin there, because he is certain his pupils know the ground.

Several of the old villages now part of London are rich in historic tradition, and the geographical features of former times still control communications and in some cases give a bias to the industries. Islington, the school district, has a long history, the remoteness of its origins rivalling those of the City. From earliest times it has been identified with stock-raising and agriculture, and at the present day the largest meat markets are either within or just beyond its boundaries. On that account the immediate neighbourhood of the school was first dealt with, as its geography and history were likely to make an appeal to the young workers residing in it.

Again, if the home area is chosen (Islington rather than London as a whole) as a basis for world geography, there are two methods of presenting the facts. The study of the home area may be first completed, and then some aspect of world geography approached, or certain facts may be studied in the district and compared with somewhat similar facts in other areas. A return is then made to the home area and a new aspect studied, and this compared with similar phenomena abroad. This method may be considered as tending to give " scrappy " information, but it has the merit of ensuring that the pupil gains some knowledge of local and world geography, and it is a method which is usually new to the pupil.

(A).—A commencement was made by an elementary course in map reading. The 6in. ordnance of N. London is used.

1. The map was orientated. Then maps of the British Isles, S. America, N. America were orientated, and the usual convention of N. being placed at the top discussed.

2. Exercises in Scale. The pupils have a direct interest in finding distances between school and work, etc. Other large scale maps were shown. Exercises involving use of scale were then devised and worked from atlas maps.

3. The roads and their directions were studied. A brief history of development of main roads. (Old maps of the village were shown, and plans showing schemes for what were then new roads. A map of the village in 1765 contrasts interestingly with the present map of the borough). Plans of other cities were shown—New York, Buenos Aires, Southampton, and contrasted with London.

4. Elevation. The contours were traced out from the 'spot' heights on the 6in. map. This work was done by a small group in their own time. The valley of the Fleet was clearly shown and the heights to N.W. This was found to be a convenient point at which to give an elementary description of the geology of the district. The routes of the Tube Railways (cut in the clay) and the direction of other lines can be contrasted.

The Philips' Visual Contour maps of the British Isles, N. and S. America, and Australia were studied by various groups and coloured.

(B).—The study of certain economic products was introduced by a sketch of the historical geography of the old village, its relation to the City, the fact that it was not merged into London till comparatively recently—the reasons for this, its occupations, the water supply.

(C).—The Smithfield and Caledonian markets are a direct outcome of the stock-raising and dairy farming of earlier times. The latter market was dealt with first, as it is familiar to most of the pupils, and it deals with home-bred animals only.

(D).—Cattle and sheep areas of the British Isles. The relief of the British Isles had already been taken. Climate was now approached. Rainfall, temperature. Sheep and cattle areas. Railway routes (Great Northern, Midland, L. and N.W. Railway, the termini all near school).

(E).—Foreign meat supplies. The central meat market, Smithfield. Its source of supply—it deals chiefly with foreign meat. S. America (relief map already done). Approached through Buenos Aires—the pampas—their products ; (incidentally) main facts of climate. N. America to be treated in same way and approach made through New York or Montreal.

(F).—Other economic products—wool and Australia. The water supply can be dealt with in certain areas, as pupils have already had an outline of London water supply.

The above indicates the method adopted, and experience has shown that London pupils are keenly interested in other cities, and for that reason each area has been approached through the study of a city.

The various reports of the Departmental Committee on Wholesale Food Markets give interesting statistics for the markets, and in some of the reports a history of the market is given, as well as an account and plans of the buildings and their plant.

The public librarian for the district has generously put at my disposal plans and pictures from his own private collection, and several of the lectures arranged by the Islington Antiquarian and Historical Society have been valuable sources of information.

The Making of Contour Models or Block Diagrams.

By W. Norman King, M.Sc.

THE following method, devised in the Geological Department of the University of Leeds, and used successfully in the Yorkshire Summer School of Geography on many occasions, provides an easy and rapid means of constructing solid models from the contour map. The greater portion of the model can be made of rough mortar, so that this ensures cheapness as well as speed.

The essentials. It is first necessary to procure a series of template punches or gauges, consisting of mild steel rod, cut into lengths of about 4in. Each of these is bored out accurately to a given depth. Assuming that the contour interval is 100ft., the depths of the bore-holes would be ⅛in., ¼in., ⅜in., ½in., and so on. The accompanying diagram will make the construction clear, and in schools where metal-work is included in the manual instruction the boys can easily turn out the gauges required for the whole school. Failing this, a bunch of old keys may be bored out in a similar manner.

The contour map, or a tracing, is pasted down on a piece of flat board, which serves as base for the finished model.

Thin nails are then driven into the board along each contour line. It is sometimes necessary to file off the heads of the longer ones so that the gauges may fit.

Then, taking the ⅛in. gauge, the nails all along the 100ft. contour are driven in so that each projects just one-eighth of an inch from the surface of the board. The 200ft. contour next receives attention, each nail being covered with the ¼in. gauge and hammered until the end of the gauge just touches the board (and no more).

The next step is to flood the model with stiff mortar until the nail heads just project from its surface. Usually this is sufficiently rough to take a " facing " of plaster, and the final modelling of minor surface features can be left until this is added.

Teachers will find this an exceedingly rapid method compared with the laborious cutting out of " cardboard " contours, and it affords an opportunity for joint work and the discussion of problems, especially at the second stage, i.e., before the mortar is added. Its drawback is that it is rather noisy, but no doubt this will make it very popular with the class.

The Blue Guides. Wales. Edited by Findlay Muirhead. Publ. Macmillan. 1922. 16 x 11 cm. pp. 260 + 22. Maps and plans. Price 7/6.

This most useful volume is one of a series which includes " London and its Environs," " Paris and its Environs," " England," " Belgium and the Western Front," and " North Eastern France," all of which can be strongly recommended. The Blue Guide to Wales contains a series of layer tinted maps prepared by Bartholomew, which should prove equally useful to tourists, whether travelling by road or rail. The text gives much practical information as to railways, motor roads, cyclists' facilities, hotels, and there is a special section of hints for followers of Izaak Walton. Full accounts are given of possible routes through North, Central and South Wales. A very attractive feature of the book is the introductory section, which contains articles on the geography, history, and philology of the Welsh by Professors H. J. Fleure and T. Gwynn Jones, and to which is appended a bibliography of books about Wales. The book is small, light, and easily portable, and yet very clearly printed, important points in a guide, and it is very carefully indexed. A number of geographers, organised by Mr Wallace E. Whitehouse, assisted in the checking of local detail.

List of Forges in England and Wales c. 1750.

By S. Herbert.

LIST of Forges in England and Wales ; with an account of the quantity of bar iron they make annually according to the best information that could be got on a strict inquiry, blanks being left for the quantity made yearly at different places whereof we could not have a certain account. The Forges in Scotland are not included.

This list is dated in the B.M. Catalogue as 1750[?] It seems probable (though I cannot be certain) that it was printed as a supplement or schedule to a Bill promoted in that year " to encourage the importation of Pig and Bar iron from His Majesty's Colonies in America, and to prevent the Erection of any mill or other Engine for Slitting or Rolling of Iron, or any Plateing Forge to work with a tilt hammer, or any furnace for making steel in any of the said Colonies."

Breconshire.	*Tons.*
Tanners Forge	150
Fanelly	200
Carmarthenshire.	
Kidwelly	100
Whitland	100
Cwmdwyfran	120
Cambrayne	60
Fannovaine	100
Cardiganshire.	
Fanfrede	120
Cheshire.	
Cranage	200
Warmingham	300
Lea	140
Denbighshire.	
Pentablue	200
Wrexham	80
Derbyshire.	
Barton Fields	120
New Mills	250
Plesley	150
Staveley	120
Durham.	
Winlaton	250
Swallwell	
Teams	
Flintshire.	
Bodfany	200
Gloucestershire.	
Lidney	350
Lidbrooke three Forges	350
Upleadon	120
Furtworth	150
Flaxley	150
Glamorganshire.	
Forrest	200
Abberavan	350
Velin Griffys	300
New Forge	250
Herefordshire.	*Tons.*
New Weare	350
Bringwood	450
Llandiloe	200
Hampshire.	
Sowley	50
Titchfield	200
Lancashire.	
Cunsey	120
Bachbarrow	260
Spark Bridge	120
Coniston	80
Caton	50
Burgh	120
Monmouthshire.	
Mahon and Tredegar three Forges	600
Pont Poole	700
Tinton (two forges)	300
Monmouth	400
Montgomeryshire.	
Mattravail	200
Dolobran	
Nottinghamshire.	
Bullwell	150
Camburton	220
Clipston	
Cuckney	
Northumberland.	
Darwin Court	120
Pembrokeshire.	
Blackpoole	240
Coiducore is re-building	
Shropshire.	
Cleobury	250
Longnor	140
Upton	260
Colebrookdale	150
Witheford	250
Sutton	260

Shropshire (continued).	*Tons.*
Tearne	150
Kaynton	250
Norton	150
Winnington	100
Prescot	100
Ligiard	200
Surrey and Kent.	
Touchley	
Barden	
Mr. Johnston's	
Mr. Gales	
Mr. Dibble's	
Shingley	
Paphole	
Sussex.	
Bivelham	
Hawkesden	
Brightlin	
Burwash	
Westfield	
Marshfield	
Woodcock	
Staffordshire.	
Consall	300
Hints	250
Cannock	180
Bromwiche	300
Staffordshire (continued).	*Tons.*
Little Aston	100
Congreve	120
Coven	100
Heath	200
Whittington	300
Swinn	140
Warwickshire.	
Bromford	300
Clifford	
Worcestershire.	
Shelsley	350
Wildon	450
Jennyhole	450
Lower Mitton	400
Woolverley	500
Cookley	300
Cradley and Lye	160
Powick	150
Yorkshire.	
Harcliffe	260
Colnbridge	150
Kirkstall	160
Waddesley	200
Kilnhurst	220
Roach Abbey	60
Mousehole	60
Sea Moor	120

A Little Book on Water Supply. WILLIAM GARNETT. Camb. Univ. Press. 1922. 6/6.

This author has characteristically taken a wide view of his subject, and the book is of very great value not only to students and teachers of geography, but to the general public. After discussing sources and types of water supply in general, detailed studies are made of the ancient water supply of Jerusalem, and of the present water supply of such cities as New York, Manchester, Glasgow. There is a very special study of the ancient and modern water supply of London, with a discussion of possibilities for the future. Appendix I. gives a very useful summary of Bjerknes' theory of cyclones, while Appendix II. gives a list of slides which London teachers may borrow. The book is well illustrated, and the general style and get up is worthy of the Cambridge University Press.

Frequented Ways. MARION I. NEWBIGIN. Constable. 1922. 22½ cm. x 14½ cm. 15/-. pp. 312 + index. 31 plates + 18 illustrations.

Geographers will welcome another work from Dr. Newbigin, though the book is of so wide a scope and breathes so much " traveller's joy " that it is sure to attract many others besides geographers. The plates, which are mainly based on actual photographs taken by the author during her many journeys, are a most pleasing and individual feature of the book. They not only give glimpses of typical scenes, but they have been chosen so as to form a running commentary on the geology and vegetation of the countries under discussion. The text is divided into two parts, the first dealing with the general characters of the lands of Europe, and the ways to the south, the second discussing in detail some special regions such as the Alps, the Scottish Highlands, the city and plain in France, the north Italian plain, Provence and Transapennine Italy. The introduction tells us that the author wishes to suggest the joys of intensive travel within the borders of Europe, and the added pleasure which those who have a geographical viewpoint will derive from such travel. The book amply fulfils this purpose, and incidentally proves that the author's well known geological and biological background have added keenness to her own observations of detail. The book is infinitely worth while, and its value to students is much enhanced by its copious bibliographies.

The Association's Tour to the Natural Regions of North England and South & Central Scotland

AUGUST 12—20, 1922.

BY F. C. MILLER.

Secretary of Touring Committee—E. E. Lupton, Esq., F.R.G.S.
Leader of the Tour—Professor W. H. Barker, B.Sc.

EAST and west across England, from Liverpool to Hull, is a smoke barrier with only the Pennine Moors rising above it. What lies beyond it northwards? The bulk of the industrialism of Great Britain, and also a variety and type of scenery unknown in the " plains and playlands " of the south. To pass, on a nine days tour, from Bradford north and west, by Ambleside and Carlisle to Glasgow, to penetrate the Highlands and then return east and south by Callender, Edinburgh and Durham to Bradford, is to see a number of natural regions in which hill and plain are sharply contrasted.

Open and smiling Airedale and Wharfedale penetrate the Pennines. Soon limestone crags and heather shelter little towns and villages strung out along this much travelled route. Settle is typical of them all—these tidy little towns suggesting by their aspect solid comfort, but comfort which is the reward and outcome of hard work.

Lakeland, seen from Ambleside, gives a very different impression. With its moist airs, green flats, and laughing lakes, it appears at first sight a land where nature is generous. Legend, history and literary association throw a glamour over it. It presents to the traveller the beauty of the lakes, to the native the grimness of the fells. Rydal and Grasmere are, in a literary sense, " Wordsworthland," Derwentwater and Borrowdale are " Southeyland." Over Dunmail Rise passes the county boundary between Westmorland and Cumberland, and also a literary boundary between " Wordsworthland " and " Southeyland."

From Bassenthwaite the road runs right away from the Lakes and out upon the Solway Plain. Carlisle, with its castle, has been called the outpost of England against Scotland, which by force of circumstances has become a railway centre. Carlisle, though not in itself an attractive town, is to the motor tourist a " jumping-off place." Leaving Carlisle is the real departure from England. Its complement—arrival in Scotland—is entering Glasgow. Crossing the Border, Gretna Green, the Falls of Clyde, even the one-storeyed houses and the speech of the people, are only incidents on the way to Scotland, which is found at the terminus of the road from Carlisle to Glasgow.

The way to the Highlands, from Glasgow, passes Dumbarton Rock—the strategic end of the route from Carlisle as Glasgow is the commercial end—and thence to Loch Lomond and the Scottish Lakes. Here are romantic scenery, historical and literary associations as in the English Lakes, but the descendants of the men who made the history are not there. The Highlands are beautiful and empty of life. The alluvial flats of Glen Dochart, that in England would be cut up into green fields, are covered only with yellowing grass and swaying rushes. The little glen that should shelter house or hamlet contains a few straggling, picturesque firs. There are neither sheep on the mountains nor cattle in the valleys to indicate that man inhabits the region. Loch Lubnaig, the lonely " lake of shadows," seems to make manifest the spirit of the Highlands. Along the loch side the road leads to Callender, standing between plain and Highlands, where the road branches to the Trossachs and Loch Katrine, but now most welcome as a centre of human life after the lovely loneliness of the Highlands.

Dumbarton, Sterling, Edinburgh, are three of the line of volcanic rocks, usually castled, which stretch across Scotland from west to east. One day in Edinburgh only allows the stranger to learn what he wants to see—not to see it. The Castle, Holyrood, St. Giles, Arthur's Seat, demand more time. Moreover, a geographer's day in Edinburgh might resolve itself into a day in the Outlook Tower and he count the time well spent.

Crossing the eastern end of the Southern Uplands from Edinburgh to Berwick-on-Tweed affords, in the run beside Gala Water and the Tweed, some of the prettiest scenery of the tour. Melrose, Dryburgh, Abbotsford, have no counterparts on the desolate western route; nor can the dark-green wind-swept pastures of Solway compare with the shining cornlands of Tweed.

Berwick is the gateway of England, and south of it the bleak Northumbrian Plain begins. Near the shore twisted and deformed thorns indicate that this is the playground of the north-east wind. The sand hills, piled against the rock on which Bamburgh Castle stands, tell the same tale. Alnwick and Morpeth, grey little towns, were outposts of Durham in the Border Wars. From Morpeth onwards appear signs of coal-mining, and soon Newcastle and Gateshead point the way to Durham, which, like Edinburgh, demands more than a flying visit. A town of narrow, crooked streets, it is almost encircled by the Wear, and is dominated by the Cathedral and Castle. Happily it is almost untouched by the rising tide of commercial ugliness around it. It has lost material prosperity to Newcastle and kept its beauty.

The last day's run shows upland ond plain close together—the Pennines on the west with deep dales leading into them, and on the east the pleasant Plain of York, suggestive in its ease and prosperity of the greater English Plain to the south of it. Just where each dale opens to the plain stands a quaint old-world town—Barnard Castle, Richmnd, Bedale, Ripon. One by one these, with their wide market places, are left behind, and the journey ends where it began—under the smoke pall.

In the cours of the tour stand out four distinct upland areas—Pennines, Lake District, Southern Uplands, and Highlands—and four plains—Solway, Midland Plain of Scotland, Tweed, and Northumbria. They all have individual and related problems.

The Pennines and the Lakes lend themselves to a comparison of their towns. Ambleside dominates many dales, and is the meeting place of the men of those dales. Richmond, and others like it, with their wide market-places, are the meeting places of men from dale and plain.

The Pennines and Southern Uplands suggest studies in routes—the stringing out of settlements along upland lines of communication. Skipton, Settle, Lockerbie, Moffat and Stow—the dominance of termini, Carlisle and Dumbarton, Edinburgh and Berwick, over the routes joining them.

The English and Scottish Lake Districts have their problems and contrasts. In the first there is a regional life with a super-imposed and widely diffused tourist industry. The Highlands are depopulated and tourists collected into such centres as Callender.

The plains of Solway and Tweed offer contrasts not only in soil, climate, products and people, but also in the position of their towns, Carlisle and Berwick. Both are castle towns, both control routes to Scotland, but one is an important railway junction and the other a town on a main line.

Edinburgh and Durham cannot but be compared with Glasgow and Newcastle. Edinburgh—a capital—and Durham—once nearly a capital, each possessing coal, have not risen to commercial importance. Glasgow and Newcastle have taken their places in that respect. The reasons for the shifting are different in the two cases, but its happening suggests that coal resources do not necessarily make a city industrial.

The tour is crammed with interest. Everywhere, as the coach goes forward, appear problems of structure and relief—the results of ages of folding and faulting, of the work of water and ice. Always, as these crop up, Mr. Barker is ready with sketch and map to explain what changes the ages have seen and what those changes have meant to man. Mr. Lupton then takes up the tale, and with his knowledge of local lore and legend and history turns it into an epic of human effort.

On an extended tour there are raised, and wholly or partially solved, many problems of comparison and contrast of natural region with natural region. At the same time come up numbers of other problems which are peculiar to the particular region under consideration. But when their existence has been thus indicated little more can be done; for the solution is only to be obtained by study within the region itself.

This statement formulates a hope that it may be possible to extend the work of the Touring Branch, and that general tours may be followed by intensive tours for study of special regions.

The Czecho-Slovak Republic. CISAR and POKORNY. 25½ x 17 cm. 215 pp. + folder map. Fisher Unwin. 1922.

This is a useful cyclopædia of the new State which is making itself so decisively felt in European life. It is in two parts, " The Land and the People " and " Economic Survey," and does not aim at exposition of original views, but rather at giving us statistics and details up to date. There are many photographic illustrations and a folder map is included at the end, and it is a pity that the latter is not better. The place-names for the most part are spelt in accordance with the decision of the R.G.S. Committee, save that their Prague has been spelt Praha, in deference to nationalist sentiment no doubt.

Wonderland of the Eastern Congo. T. A. BARNS. Intro. Sir H. H. Johnston. xxxvi. + 288 pp. 27 x 17.5 cm. Folder map and many photos. Putnam. 1922.

This is a large and richly illustrated record of travel from Katanga to Tanganyika, northward east of Tanganyika to Lake Albert Edward, northward still along the west side of this lake and Ruwenzori to Jrumu, whence the return was to the Congo. The book is popularly written, and the author did big game hunting and cinema photography. He got a specimen of the largest species of gorilla. He evidently thinks there are still zoological surprises awaiting us in the Congo forest. He found a dead okapi, and hunted with the Wambuti pigmies, about whom he gives a few interesting remarks. Mr G. E. Talbot contributes a chapter on African entomology, and Mr Barns gives a statement of the entomological data a collector should supply. Sir H. H. Johnston contributes a characteristically interesting introduction of eighteen pages dealing with the scientific problems of natural history of the big game of Central Africa. The photographs reproduced are very interesting.

Historical and Economic Geographies. Vol. 3. Great Britain and Ireland. Piggott and Finch, Dent. pp. 351. 7½in. x 5in. Price 4/6.

The really good school geographies of Great Britain and Ireland are few, and the many good points in the new volume of Messrs Dent's deserve notice. In this volume the economic data is treated historically to show how the present has developed from the past, and while this has been generally well done, it is a question whether it has not been overdone and the geographical data of the present been understated. An exceptionally good chapter is the one on Population, and other good features are the chapters on Aviation and Wireless Telegraphy.

The book would be improved by a good introductory chapter dealing with the space relations of the British Isles, and a few of the maps need more careful revising; the railway map on page 131 (fig. 34) is rather badly out. The value of maps like those on page 42 dealing with vegetation is probably very small on the scale on which they are shown. It would be probably better to include the vegetation map of Britain in a large general map of Europe. There is no index. H.M.S.

Ordnance Survey and Map Issues, VI.

WALLACE E. WHITEHOUSE.

TO the material described in the Summer Number, 1922, of the "Geographical Teacher" should now be added several new issues.

ONE INCH TOURIST MAPS.

BRIGHTON AND DISTRICT.—A very attractive map deserving of more notice than can be given in this place. It is unusually large, covering nearly 1,000 square miles—actually 26 miles by 38 miles. The shorter length is broadly North and South. Crawley, Wisborough Green, Mayfield, Heathfield and Hailsham fall within the sheet, and the coast line extends from Littlehampton to Eastbourne. The map shows the great sweep of the South Downs, while to the North both St. Leonard's Forest and Ashdown Forest areas are entirely included. The basins of the Adur and Ouse offer useful points for map reading, and much of the Arun basin is shown. The conventional symbols resemble those of the maps described on page 307. It is layer-tinted through greens to browns (no scale of tints given), with tint or colour changes at each 100 ft. The change from green to brown takes place at 200 ft.; this should be contrasted with Exmoor and Dartmoor sheets. Contour lines are marked at 50 ft. interval, tree signs are in black, rivers are in solid blue and lakes in blue ruling. The settlement and communication symbols are similar to those employed in the Popular Edition of the One Inch Map. Price 2s., paper, or 3s. linen-backed for all One Inch Tourist Maps.

LAND'S END AND LIZARD.—The map is rather smaller than the above, being 24 miles by 33 miles, and is coincident with Sheet 146 of the Popular Edition. It extends broadly from Truro—Falmouth to Land's End, but the Isles of Scilly are included as an inset. As in the previous map, there is no vertical nor cross light shading and no hachures, apart from those marking cliff edges. The only difference in layers, colours or symbols as compared with the Brighton map is that small pools are shown in solid blue. In each case the amount of land about 800 ft. is small, so no colour change is shown at the 800 ft. contour. The map should be added to the collection of representative sheets of British topography which with advantage might contain as a minimum from those already published: Snowdon, The Lake District, London, Dartmoor, Brighton, The Trossachs.

CHELTENHAM AND DISTRICT.—Covers 22 miles by 31 miles, includes Moreton in Marsh, Stroud, Broadway, and extends westwards about eight miles beyond Gloucester. Cheltenham is centrally placed. Details are similar to those for preceding maps, except that the brown layer tints are rather lighter and the changes take place at each 200 ft. It is a clean-looking map, but contains much material.

POPULAR EDITION ONE INCH MAPS.

The issue of this highly successful series is being accelerated, and the finished area is creeping northwards and westwards. The present limits of issue are broadly all the land to the south of the line Wrexham—Newark and east of the line Llanfyllin—Otterton. In addition, the S.W. peninsula is complete, together with five other sheets, viz. :—17 (Isle of Man), 49 (Pwllheli), 50 (Bala), 59 (Dolgelley), and 109 (Cardiff)—in all, a total of 93 sheets out of the 146 for the complete issue. It is unnecessary to set out again the merits of these maps; contoured at each 50 ft. they are excellent for class work on land forms, etc.; two recent and almost simultaneous issues, viz., No. 55 (Grantham) and No. 59, provide a severe test for the scheme. In the Bala map each 250 ft. contour of the mountain areas is accentuated and a slight "terracing" results, which may be considered a blemish, but certainly facilitates contour counting. The maps are neither hachured nor layer tinted, but woodlands are in green, with roads of various grades in different colours. The amount of detail is considerable, but the sheets have a clean open appearance.

SPECIAL MAPS, ETC.

BRISTOL.—This city was rather inconveniently situated on Sheet 111 of the "Popular" Edition. It has now been centred on a special sheet (18 miles by 27 miles), which also includes Clevedon and a portion of the Welsh side of the Bristol Channel.

KEIGHLEY.—The Six Inch Town Map of this district is on issue. The style of these maps is shown on Plate XI. of the Ordnance Survey "Large Scale Maps" pamphlet, and a list of issued and projected town maps is given on page 15 of that publication.

LARGE SCALE MAPS PAMPHLET.—Price 6d. A second edition of this has appeared. Reference has been made in earlier articles to the value of these handbooks as sources of specimen maps suitable for class purposes. The second edition contains a few amendments. The text now refers to the new levelling work and the future O.S. datum level (Newlyn, Cornwall). The new altitudes will not show much difference from the old in the vicinity of Liverpool Bay, but the eastern counties may show differences up to as much as 1¾ feet. Plate V. (scales) has been apparently withdrawn (without a renumbering of the remaining plates in the review copy), Plates VIII. and IX. have been replaced by better examples, and the new prices for large scale maps are given.

QUARTER INCH MAP.

SHEET 6 (SCOTLAND).—This is a particularly beautiful production. The map itself is 18 inches by 29 inches, and so covers a considerable area of the Western Highlands with Skye and the Southern Hebrides. It is layer-tinted (browns beginning at 400 ft.), and should rank as an ideal motoring map.

ATLAS OF ENGLAND AND WALES.—This marks a new departure for the Ordnance Survey, and is one which deserves every encouragement. No school geography library should be without a copy for reference purposes. The maps themselves are the layer-tinted quarter inch series previously described; each is linen-backed and mounted on guards. The closed book with strongly bound cloth covers is 15½in. by 14in., and there are 24 double-page maps opening flat and conveniently arranged for study. In addition to the index map to the folios there is a full page of beautifully executed symbols. [It should be noted that these are each considerably larger than the corresponding symbols on the maps, and the addition of the actual symbol might have been an advantage.] The volume is rounded off with a Towns and Village index with upwards of 12,000 names; each has the folio number and reference square added. This index does not, of course, include all the place-names on the maps, but an idea of its character can be obtained by noting that 16 Suttons are given, with an additional 29 compound place-names of which Sutton forms the first element. The price of the book is 30s., compared with a total of 36s. for the 12 separate maps, or if section-mounted, 48s.; the price of the atlas is certainly low when its quality is considered. It will perhaps be rather inconvenient to handle while motoring, but it is admirable for the library.

Reviews.

The Climates of the Continents. W. G. KENDREW. Oxford, at the Clarendon Press. 1922. xvi. + 387 pp. 21/-.

The author aims at filling a gap in the sources available for the study of the geography of the earth by description of the actual climates of the countries of the earth, with references to serious sources of information as far as possible. The value of the book for reference has been greatly increased by making each chapter, dealing with some region, complete in itself; in other words a certain, not very great, amount of repetition is found in the book, and the geographer who is not a meteorological specialist will be grateful for this, as the repetition often puts the same point in another way and in another setting, thus helping forward an understanding of the principles involved. The work has been done with much care, and the general bibliography indicates the author's seriousness; he acknowledges the help of Mr Beckit in his preface, and mentions Prof. Herbertson's great work, in conjunction with Dr. Bartholomew, on the Meteorological Atlas. Africa is treated in fifteen sections, Asia (with European Russia) in eight, Europe is divided into north, west, central, and Mediterranean regions. America is given two chapters, the first of which deals with the continent north of Mexico as a unit, while the other discusses the remainder of the continent under six regions. Australia and New Zealand are treated successively.

We can best illustrate the value of this book by summarising small sections here and there. In north central Europe the rainfall reaches its maximum in summer and is convectional, i.e., is related to the drawing in of sea air to replace the heated air rising off the land. The maximum fall is, however, usually in June, whereas the maximum surface heating is in July. To understand this we must know that the free atmosphere lags in temperature behind the sun even more than does the ocean, and in June it is as yet but little above its minimum temperature, whereas the air near the ground is already heated. It is therefore at this time that there is the greatest contrast between lower and upper air, and convectional currents are strongly developed. Though summer is the rainiest season in Central Europe, the air is on the whole relatively drier than in winter and evaporation is more active, so the distribution of moisture is more uniform from the point of view of plant and animal life than the monthly rainfall means indicate. We wish we had space to sum up the statements concerning Switzerland (largely drawn from Das Klima der Schweiz, by Maurer, Billwiller and Hess), showing the conditions in deep valleys, on exposed heights, and on the mountain borders and so on, but it will be more generally useful if we attempt to summarise the account of the Indian Monsoon, which is largely based upon the researches of Sir John Eliot (Climatological Atlas of India, Bartholomew, 1906) and his staff. In January, Central Asia has very high atmospheric pressure, but the Himalayas and Thibet project into the upper air, and only rarely do winds cross the mountain chains into India, and then it is chiefly from Afghanistan. It is true that the night winds blow down the great valleys, but the day winds blow up and are compensatory. The air settles down from upper layers on to the plains of North India, and is guided eastward and south-eastward by the great Ganges plain. So India is free from the cold waves that blow down the gorges to chill China in winter. At intervals rather shallow cyclones, apparently connected with those which appear in winter over the Mediterranean, appear to move across Syria and Iran into North India, to which they bring some rain collected especially near the Himalaya. The Deccan is little affected. In March temperature rises and pressure falls on the Deccan, while a slight belt of high pressure exists over the sea. With the pressure fall sea breezes bring rain to the west coast and to Bengal and Assam, and in the spring (March-May) there is ten inches of rain on the S.W. coast (the so-called "Mango showers"). Wind squalls arise suddenly and are apparently local, they mean rain only near the coast. In June the great monsoon bursts, though, be it noted, the sea breezes have already been blowing for some time. The burst is a marked and regular feature, and Eliot's view is that as the heating of the land increases the air rises off the surface and cooler air is drawn in with increased force, so that the belt of relatively high pressure over the sea is broken, and the air currents come through from the equator, at this season no longer an area of low pressure over the sea. At some stage, therefore, in the development of the monsoon the belts of low and high pressure between the coast of India and the S.E. Trades of the Southern Hemisphere are wiped out, and these S.E. Trades, becoming S.W. winds after crossing the equator, add their enormous power to the sea breezes already blowing into India. The author discusses the remarkably sharp boundary of the monsoon rains over against the dry Indus valley, and he discusses the late autumn rains on the Madras coast as connected with the retreat of the summer monsoon, which apparently recurves in the Bay when the pressures over the land rise, so that the well-known Madras rainfall is not connected with the oncoming of the north-east wind, as is so often stated. Most of these facts are known to some students, and indeed this is true of a great deal of the book under review, but this does not diminish its merit, which is that of a good exposition of the best specialist information. The book is one which should find a place in the library of every school where geography is studied. Will teachers please make a special note?

Age and Area. A study in geographical distribution and origin of species. J. C. WILLIS, F.R.S. With chapters by Hugo de Vries, H. B. Guppy, Mrs E. M. Reid, and James Small. Cambridge, at the University Press. 1922. x. + 259 pp., 23 + 15.5 cm. 14/-.

It is generally agreed that plants dispersed over large areas began upon smaller areas. In the process of dispersal barriers produce very important results, while in the majority of cases methods of dispersal are likely to be effective over small distances only. The stability of the association of plants in possession of any given area shows that a good dispersal mechanism is only rarely of much value. More than half of the cosmopolitan genera of plants have little or no specialised dispersal mechanism, nor is such well marked, on the whole, in the largest and most widely distributed families. The rapid spread of plants introduced into new countries is claimed to be due to the changes of conditions made by man in interfering with the society of plants already in possession. Acclimatisation by man is a matter of trial and error, many errors in fact, but nature works slowly by small steps spread over vast periods of time. Even if the steps are but on an average a yard per annum, this would be enough to cover the whole globe within the duration of the Tertiary Period of geological time, obstacles apart. Physical obstacles are important, but others arise from the constitution of a plant, e.g., a herbaceous plant will not, while a tree will necessarily, be stopped in the expansion of its domain if it reaches the border of an area where trees will not grow. The more specialised a form of life becomes, the more limited becomes its possible range in most cases. Plant dispersal in nature is at best a slow business. In Ceylon, Dr. Willis found that species which were endemic (restricted to Ceylon) usually occupied the smallest areas, that species peculiar to Ceylon and Peninsular India usually occupied larger areas, and that species ranging beyond these regions occupied the largest areas. Local adaptation was not found a satisfactory explanation of the origin of the localised distribution of the endemic species, and Dr. Willis urges the general principle that the area occupied increases with the age of the species, subject of course to limitations imposed by barriers and to opportunities opened up by their removal. To avoid error the principle should be applied only to groups of at least ten species closely allied. It was suggested that if a survey were to be made it would be found that the outlying islands of New Zealand would have plant species which were very old and very widespread in New Zealand itself, and this prediction, with other ancillary ones, was abundantly verified. It was further predicted that invading plants giving rise to new (and therefore endemic) species in the new home would have these new species distributed in zones, the fountain-head of which would be near the point at which the plant entered. This again was verified in New Zealand. General distribution has thus been governed positively largely by age and negatively mainly by barriers. The larger families and genera of plants are usually the older and occupy the large areas, and natural selection brings about destruction of species when they are newly born and occupy minute areas, rather than when they have established themselves on a reasonable area. When once the last-named establishment has occurred, extermination will rarely happen, except in the case of some great change of conditions, such as that which is apparently responsible for the bare maintenance of the great trees of California. The change in this case is the warming and drying of the climate consequent upon the northward shift of climatic belts with the retreat of the great ice sheet which once spread so far south in America.

The genera with only one species and those with only two are very numerous and have restricted area; those with many species are less numerous and of wider range.

Dr. Willis believes that his principles hold good for animals as well as for plants, but that in this case there are probably greater deviations connected with the greater complexity of the factors.

To the biologist the Willis principles offer a welcome escape from the once fashionable overworking of the Natural Selection theory, and readers who are interested will find an interesting chapter on the subject. Evolution is claimed, especially by Guppy, to proceed not from individual to variety, variety to species, species to genus, and so on, but inversely, the great families and genera appearing very long ago and subsequently breaking up into smaller genera, species and varieties.

In spite of various references the reviewer is not satisfied that Dr. Willis has shown how on his view there comes to pass the dying out of species on the almost universal scale of which students of fossils always speak, but his views open up many new lines of thought with regard to human as well as to plant and animal distributions, and they certainly help wonderfully to clear away many difficulties of those geographers who have tried to understand floral and zoological regions and their relations one to the other. In many things Willis is admittedly going back to Hooker rather than making absolutely new points.

Town Theory and Practice. Edited by C. B. PURDOM. Benn Bros. 1921. 5s. 140 pp. 19 x 13 cm.

This collection of essays by W. R. Lethaby, G. L. Pepler, Raymond Unwin, Sir T. Chambers, and R. L. Reiss will attract students who look back with affection to Ebenezer Howard's " Garden Cities of To-morrow." Professor Lethaby's contribution is " The Town Itself," and is full of his vigour. " The great purpose of life in towns is to produce finer and finer types of civilization and civility." " A city is one big organism and itself a work of art." Everyone who is studying his own town will find such sayings worth turning over, even if their relation to the squalor of most English cities in 1922 seems remote. Mr Pepler urges that industries should be encouraged to move out of great cities, and that the space acquired should be used for open spaces, especially along the boundaries of the units of which the city is composed; with this better demarcation of smaller units not only would there be more open spaces, but also we should find a civic sense growing up within the smaller unit thus made more distinct. Mr Unwin discusses the best size for towns in order to secure a good social life. The very large city is often put to enormous expense for water supply, the expense per head of the population to procure the necessary flow of water being sometimes four or five times what it would be for a smaller aggregate. Similar considerations apply to passenger traffic facilities, to telephone organisation, and so on. The big city is therefore uneconomical as regards public services, but it immensely increases the opportunities for private gain which fall to the keener or more fortunate inhabitants, sometimes at the increased expense of the less fortunate. In general, Mr Unwin thinks the city of 50,000-75,000 is likely to be near the optimum; he wisely doubts whether the idea of the university in the large city is definitely good. Sir T. Chambers emphasises the need for breaking down the artificial division of the population into detached groups of country folk and townspeople and for lessening the drain of people from the country districts. Mr Reiss argues for the holding of a town's land either in public ownership or by a company with dividends limited by statute.

Handbook of Commercial Geography. G. G. CHISHOLM. 9th Edition. Longman's. 1922. 25/-. xvi. + 824 pp. 22.5 x 14.5 cm. Many diagrams, maps and tables.

Students of geography are grateful to Mr Chisholm for his monumental patience in maintaining this famous work of reference edition after edition. They will also sympathise with him in his difficult task of presenting the facts of commercial geography, the exchange of goods, to a world of disordered exchange. In many cases Mr Chisholm has wisely used the statistics of 1913-14 rather than later ones, but those later ones are given when they seem directly valuable. The statistics of water power, for example, are brought up to date with useful warnings against discrepancies such as the enormous ones between different estimates of continuous horse-power from water in the U.S.A. (from 30 to 200 millions).

While one still finds some familiar paragraphs from the old editions, the first section is remodelled almost completely, and one feels that in this first part psychological factors are more taken into account than they were formerly. The section on Commodities, which occupied 150 pages in the 8th edition, fills 172 in the new, and among minor but interesting additions one notes a page on the banana.

The next and longest secton is now entitled Regional Geography, and here we note a welcome improvement, for the section dealing with Europe as a whole now takes up the question of trade routes. The treatment apart from this is under political units, and the new ones come in for short surveys often with suggestive hints. One of these concerns Lodz. The textile industry in Poland was due to government decrees which led to settlement of Saxon and Silesian industrialists just within the Polish border. Lodz grew rapidly in consequence of this, though it had few local advantages. How will it be affected under the new conditions? Russia is treated under the heading " Old Russia," the author abstaining from statements concerning the new units save in the case of Finland. Mr Chisholm maintains his philosophical liberal traditions and keeps his book clear of vulgar errors about " inferior races " and the like; his tributes to the Chinese may be said to carry added weight after the world's experience of the last few years. The regional section of the book occupied 344 pages in the old edition and has now grown to 417 pages. The appendix has the usual tables, with several alterations, and there is an addition in the shape of a list of alternative geographical names, in which Mr Chisholm largely follows the R.G.S. system, which we hope will spread universally.

It would be an impertinence to offer criticisms of an established work such as is this one, and the student may feel quite sure that the author has spared no pains in collection of information. His care and patience have passed into a proverb among geographers.

Introduction to Forecasting Weather. P. R. ZEALLEY. 32 pp. 19 x 13 cm. 1s. Heffer, Cambridge. 1922.

After giving some account of the compilation of a weather map, the Beaufort notations and so on, there are diagrams and notes on isobars in cyclones, secondary depressions, V depressions, wedges of high pressure, etc.

A History of Arabia. D. G. HOGARTH. Clarendon Press. 1922. 20 cm. x 12 cm. 131 pp. † large folder map. 7/6.

Possibly the most interesting feature of the book for geographers will be the detailed sketch map of Arabia, scale 102 miles to the inch, giving the results of all important journeys undertaken during the war, and extending as far north as Palmyra and Tekrit, and as far east as Cape Ras-el-Hadd. This is undoubtedly a great acquisition for students of Arabia. The text gives an outline of the history of Arabia from our earliest knowledge down to the entry of the Arabs into the Great War, and is therefore much compressed, especially in the latter part of the book. The first three studies, "Times of Ignorance," "Institution of Islam," and "The Prophet as King," are very finely written, and give vivid glimpses of the life of desert and semi-desert peoples. The student of Arabia will find it a useful companion of Doughty's great work, and will naturally take the name of the author as an assurance of intimate knowledge, sympathy, accuracy, and literary powers.

A History of Persia. BRIGADIER-GENERAL SIR PERCY SYKES. Clarendon Press. 1922. 20 cm. x 12 cm. and map, pp. 188. 7/6.

This companion volume to a "History of Arabia," by Dr. Hogarth, is well worth the attention of geographers, as well as of historians. Throughout the tangled story given in its pages, the geographical background is felt to be ever present, influencing the lives of the people and the course of their troubled history in many unforeseen ways. Those who have read the story of Persia in the records of that fine old student of historical geography, Herodotus, will appreciate this background very fully. The close of the book gives a very instructive, if somewhat pessimistic, account of the condition of the region to-day and of its possible future. Persia is the victim of the ambitions of others; she has suffered in similar fashion for ages, and her hope, as that of so many other peoples, including ourselves, is in the bare possibility of the diminution of scope of those ambitions. For this account of the unfortunate country, and especially for the studies that give its pages an intimacy we all value, we are most grateful to the author.

Education on the Dalton Plan. HELEN PARKHURST. Bell, 1922. 214 pp., 19 x 13 cm.

Dalton Plan Assignments, Vol. I. English, Geography, and History. Prepared by the Staff of Streatham Secondary School. Bell, 1922. 2/-. 79 pp.

The former of these two books is a careful description of the inception and aims of the Dalton Plan, with some account of its practical working. There is an appendix giving sample assignments in use in British elementary schools. Teachers interested in new methods will gain a very clear idea of the possibilities and limitations of Miss Parkhurst's scheme by studying the book. It is inevitable that any attempt to standardise an intangible ideal into a practical, easily-grasped method of work brings failure in its train. All teaching should be so sensitively attuned to the varying needs of the special children being taught and the aptitudes and education of their teachers that no scheme can ever be universal or even always useful in one school. The great advantage of studying as many schemes as possible is that from them one may gain as much variety of outlook as possible.

In the latter book, we found the geography syllabus disappointingly empty of names of books of travel and fiction. If travel is a liberal education, books of travel are decidedly a good preparation for that liberal education, and no real understanding of the lives of people in other lands can be gained even from such textbooks as those mentioned on pp. 34 and 50. It seems inevitable that the reading of text-books, and the answering of questions on them, unsupported by such wide reading, and without the advantage of the teacher's oral lessons, must give a child even less knowledge of the world than did the old systems. There is much fine literature that is full of an unconscious, yet none the less real, geographic point of view, as every lover of Herodotus or Robert Louis Stevenson must know. Another notable omission from the syllabus is the study of the home region, accompanied by daily observations on the weather, nor is there any mention of the formation of a museum of local specimens of archæological, geological, botanical, or zoological interest—a thing which would seem to be peculiarly in the spirit of the Dalton plan.

Reference Books relating to Derbyshire, issued by the Derby and District Historical Association in connection with the proposed Regional Survey of the County. Chesterfield, Bales and Wilde, printers, Gluman Gate. Price 6d. (7d. post free).

This is a short bibliography which must be of value not only to students themselves, but also to local libraries which try to meet their needs. It discusses general works, works on antiquities, geology and mining, ecclesiastical matters, natural history, family and local history. The value of the book, and at the same time the difficulty of compiling it, would have been greater still had some articles in important journals been included as well as separate books.

The idea of such a bibliography is heartily welcomed, and we only hope that branches of Geographical and Historical Associations will combine in many localities to produce work on these lines.

Allied Shipping Control. BY J. A. SALTER, C.B. Clarendon Press. 10/6 net.

This volume is a most important addition to the series published by the Carnegie Endowment for International Peace, which deals with the social and economic history of the World War. The reactions of that great catastrophe in the political sphere are fairly well known and appreciated, but those in the economic sphere, being less obvious, tend to escape attention, and are theretore peculiarly worthy of study.

It may be said at once that Mr Salter has executed a very difficult task with great skill and judgment. His experience as secretary of the Allied Maritime Transport Council, and chairman of its permanent executive organisation, gives him unique authority, and his book will be of permanent utility to economic geographers. To select any section of it for special praise would be invidious, but students of international problems would do well to study with particular care the chapters in which Mr Salter discusses the nature and future of international administrative organisation, with special reference to the tasks of the League of Nations.

S. HERBERT.

Le Maroc. GEORGES DESROCHES. Paris, Flammarion. 1921. 328 pp., 19 x 12 cm, with folding map.

This little book, with an introduction by le maréchal Lyautey, is the work of one who will be well known at least to those who formed the party which visited France, Easter, 1922, under the guidance of an officer of the Association. It gives an interesting statement of the position of Morocco, politically, economically, socially, and so on, and makes a feature of the reproduction of official documents. A geographical précis of the people is followed by an outline history. and then come details of travel to and in Morocco in past and present. Sketches of court life, domestic arrangements, manners and customs, law and its administration, posts and telegraph, banks and currency, economic riches and needs, make up the greater part of the book. An appendix gives statistics in summary form, and adds thereto a very practical guide to the routes of travel by sea, by land, and by air, the ports, and the European establishments. A chapter of practical advice to visitors and immigrants terminates an interesting book that is very much alive.

Cambridge County Geographies. BANFFSHIRE. W. BARCLAY, Editor of the Banffshire Journal. viii. + 140 pp., end pieces giving coloured orographical and geological maps, numerous illustrations. Cambridge, at the Univ. Press. 1922. 3/6.

This book follows the now well-known scheme of the County Geographies, and if, on the one hand, we have to regret the many limitations that scheme involves, on the other hand we must acknowledge that the simplicity of the scheme has done a good deal to make the execution of the scheme practicable. A more philosophical plan might have produced a few better books, but would have found much greater difficulty in spreading over the whole country.

The author, speaking from local knowledge, says that the most potent export of the shire is its young men and women fitted by education and discipline to play a creditable part in the affairs of life. This is self-evident, and gives Banffshire, like many another hill country, a vast importance too little appreciated by those who judge values from trade statistics. One fears that the export is going on rather too vigorously at the present time, and that the big cities are not paying for the precious material they absorb and so easily allow to deteriorate through their carelessness; the preliminary count for 1921 indicates a decrease from 61,402 to 57,300.

One wishes the scheme allowed the author to gather up more facts and set them together to give an account of the Enzie, the north-west corner of the county, wherein fidelity to the old church has been such a feature, but it may perhaps be as well that this study of natural units should be developed independently of such a definite series.

North America. N. B. Allen. 391 pp. 18½ x 12½ cm. Ginn. 1922. 188 illustrations and 13 maps. 4/6.

This little school text book will be welcomed by teachers, especially if they have used any of the authoress's other books. The numerous illustrations are well calculated to arouse children's interest, and suggestive questions are given below. We would suggest, however, that in future editions such scrappy questions as those printed beneath the picture on 364 might be avoided. The answer to the second question has nothing whatever to do with the first, nor is it in any way linked up with the picture. The text is thoroughly readable and suggests many useful lines of thought for practical work and class debates, and the book is one that every teacher taking the geography of North America with junior forms should consider.

Local History. H. W. Saunders. Pub. Kent Education Committee, Maidstone. 2/6 post free. 182 pp., 14 x 21.5 cm. Paper covers.

This is the work of an enthusiast, and teachers with almost every variety of taste can find something in the multitude of his suggestions. We hope that those who use the book will remember the author's warning that the locality per se is not enough, but that the locality must be made to mirror the development of civilization. To this another general suggestion should be added, namely, that it is important to institute comparisons with other districts and other countries at every turn. In many respects as a local study we prefer Brentnall and Carter's "Marlborough Country," which should be revised and re-issued; but the present work has points of real interest and value, and the author does make the nearer past live. Unfortunately he knows too little to suggest the romance of local pre-history as well. The student will be well advised to use as companions to this book Belloc's "Old Road" and the "History of Everyday Things in England" by Mr and Mrs Quennell. The author gives many suggestions of sources of local information, and his book should materially assist the cause of school education in Kent.

Man as a Geological Agent. R. L. Sherlock. 359 pp. + 12 maps and illustrations. 23 x 14 cm. £1. Witherby. 1922.

This highly suggestive book should be read by all students of the problem of man and his environment, for it is an attempt towards a scientific philosophy of man's action on his environment. The introduction tells us that the work "was suggested by a passage in Huxley's 'Evolution and Ethics' which seemed to point to an apparent interference with nature by man. But before interference with nature can be assumed to be more than trivial it is necessary to discover what man actually does effect, and it is this question that forms the subject of the present work." The author then proceeds to discuss, on a basis of statistics collected from innumerable sources, such problems as the quantitative effects of mining, quarrying, road making, accumulations on town sites past and present. Characteristically enough, not only are paving stones, bricks, drains, tiles and pottery treated from the point of view of their origin and removal, but the question of their attrition is considered. A timely and most instructive chapter is that discussing the accumulated effects of deforestation on temperature, composition of the air, rainfall, drainage, and the rate of flow of rivers; a careful study of this chapter should help to develop a much needed national forestry conscience. The final chapter draws some conclusions from the data given in the previous chapters, and our author's philosophic turn of mind makes him attempt a broad survey of the whole possibilities of the development of the subject. If his speculations about the past of the problematic Martians and the future of the men of earth seem remote and far fetched, yet his practical recognition of the translation of man's thoughts into visible and measurable effects on his environment, and his broad outlook on the complexities of the problems he is attempting to solve, make the chapter very illuminating. It is earnestly to be hoped that this general study based mainly on statistics of the British Isles will be followed by serious detailed monographs of various regions the whole world over, for it is evident that this would be a valuable contribution to evolutionary study of mankind.

This review judges Mr Sherlock's book as in large measure a pioneer effort. It will be obvious to the thoughtful reader that the statistics are in some cases of doubtful completeness and of questionable authority, while the deductions seem to need a good deal of revision and consideration from other points of view. One very valuable element in the book is the author's appreciation of the interweaving of man's efforts with natural processes and of the consequent accelerations and retardations of those processes which men's thoughts and schemes have brought about at various periods of history. This is a useful correction to the too facile application of uniformitarian ideas borrowed from the geologists.

Peoples of the World. Junior Regional Geographies. Book I. W. H. BARKER and L. BROOKS. 112 pp. 19 x 12.5 cm. Univ. Lond. Press. 1922. 1/9.

A very short and simple introduction to the social geographical study of human races. The book should prove most useful for the lower classes in elementary schools, and teachers are advised to get down a specimen copy to see if it meets the need in their school.

Christian Education in China. Published at 25, Madison Avenue, New York City. xvi. + 430 pp. 20 x 14 cm. 1922.

As members of the Geographical Association know, its associated editor, Professor Roxby, was invited in 1921 to proceed to China as representative of the societies in England which support certain schools and colleges in China and to co-operate with certain representatives from the United States of America in investigating the relation of those schools to new movements of thought and administration in China. In the course of their work the commission met many leaders of thought and action in China, and the report they have issued is most enlightening as to many matters relating to the world's oldest tradition of continuous civilization. In 1905 the famous old-style literary examination was abolished, and a modern system was started, at the head of which there is now a Ministry of Education. The new system has at its base the lower primary school with a four-years' course. This is followed by a three-years' course in a higher primary school or an industrial (B) school. The next stage is four years in a middle school, or a course in an industrial (A) school or a normal school. Above this the alternatives (after the middle school) are the higher normal school with one preparatory year and a four years course, the professional industrial school with a preparatory year and a three years course or the university with two preparatory years and a four years course. The lower primary schools are on the responsibility of towns and villages, the higher ones are established by districts, the middle schools by provinces, and the highest grade is under the central government. The system is partly derived from Japan, and is not yet very well adapted to Chinese needs, the staffing of the middle schools and the subsequent careers of their pupils offering serious problems. There are, however, over four million pupils already receiving education, and the middle school will probably have its course extended to cover six years. Foreign societies support schools in connection with missionary work, Roman Catholic schools having 145,000 and Protestant schools about 214,000 pupils, numbers which are large in proportion to the numbers of professed members of the religious bodies concerned, but small in proportion to the numbers of pupils in the government schools. The commission believes that the Chinese Government will permit the societies' schools to go on, and they speak appreciatively of the breadth of mind of Chinese leaders, while urging upon the societies concerned that they should look forward to the ultimate control of education by the Chinese, and should prepare for it by encouraging Chinese adherents to take an increased share of the direction of the societies.

The commission refers to the reliance on moral considerations, the general acceptance of fair dealing, the belief in education, the widespread habit of contentment, the almost universal courtesy, the modesty of the women, the respect for the aged, the care of relatives and the hereditary good taste which are acknowledged features of Chinese civilization. They fear that the restriction of concern to the family, clan or province hinders the growth of public spirit and makes corruption in the government only too general, and they regret certain defects of the "large household" with three or four generations living together. They are quite clear that what is wanted is no mere Westernization, indeed one can see their anxiety lest the Western capitalist should get too great opportunities of exploitation.

Every part of the long report deserves appreciative comment, but our space allows us only to select two of the proposals for discussion at this juncture. One which is very seriously argued bears the impress of the geographer's mind, and calls for an Institute of Economic and Social Research with duties of regional survey of the rapidly changing conditions. Messrs S. D. Gamble and J. S. Burroughs have just published "Peking, a Social Survey" (G. H. Doran Company, New York, five dollars), and this book indicates many possible lines of work. A parallel Institute of Educational Research is also suggested, and the need for both is emphasised in view of the incredible pressure of life in China; the sheer struggle for physical existence of so many millions has serious results in social life in many directions. It is to be hoped that when Professor Roxby returns to the work of this Association he will expound the schemes for these Institutes at greater length, pending which it is best not to attempt to forestall his contributions. This review, however, gives his colleagues an opportunity of expressing their gratification at the recognition of his careful thought about China and its problems and their appreciation of the remarkable way in which he has contributed to the demonstration of the value of the human geographical outlook upon modern problems.

A Geography of the British Isles. A. R. LAWS and P. LANCE. 320 pp. 19 x 13 cm. 3/6. Clarendon Press. 1922.

A book which appears to be of good quality, built on familiar lines, physical divisions and their productions, climate and agriculture, industry, communications. A short and rather poor section touches the " development " of the country in the past, but in it the origins of counties are profitably mentioned. Simplified maps are a feature of this abundantly illustrated book.

The Andaman Islanders. A. R. BROWN. 494 pp. + appendix and index. 19 plates, 2 maps and 46 figures. 23 x 14 cm. Cambridge Univ. Press. 1922. 40s.

The book is a serious study in social anthropology that should be read by every student of man's social evolution or of psychology. After being trained by Dr. A. C. Haddon and the late Dr. W. H. R. Rivers, the author went to the Andaman Islands in 1906 to carry out research under the terms of the Anthony Wilkin Studentship in Ethnology. As a good scientist, the author devotes the first four chapters to a logical setting out of the data on which chapters five and six, the most important in the book, are based. These two chapters are an attempt to interpret from a scientific psychological point of view the ceremonial customs and beliefs and the myths and legends of the Andamanese, and we found them so eminently sane and reasonable that we recommend a perusal of them to all psychologists, whether they are studying the ways of native tribes in other lands or the ways of themselves and their neighbours. The appendix of 86 pp. of small type on the technical culture of the Andamanese will be much appreciated by the specialist in such matters.

British North Borneo. OWEN RUTTER. 391 pp. + appendices and folding inset map. 23 x 14 cm. Numerous illustrations. Constable. 1922.

The author of the book has lived in North Borneo for many years, first as a Government officer and later as a planter, and so is well qualified to write upon this little known region, especially as he has brought to bear on his surroundings the eye of a keen and intelligent observer and has studied the native populations with a sympathetic understanding that is all too rare. The book contains material both for the student of economic geography and for the anthropogeographer, but it is also of profound interest to-day to the citizen who is making any serious effort to solve the tangle of the position of the white man and the native in the tropics—a tangle which must be cleared up soon if there is to be peace in the world. The book does not discuss this as a political problem, but it gives an accurate picture of the relations between white and native races in one important part of the tropics, and is therefore of all the more value. The book is full of humour, and will be found equally attractive by the general reader and by the teacher who wants to get useful pictures of other ways of life. It is interesting to note that up to the present no scientific geodetic survey of the region has been made, so that there is no possibility of an accurate relief map at present. Surely here is a field for survey enthusiasts.

The Discovery of Australia. G. ARNOLD WOOD. 541 pp, numerous illustrations + inset map. 22 x 14 cm. Macmillan. 1922. 25s.

Though this book is written by a Professor of History for students of history, yet it is of great scientific interest to geographers, who will specially appreciate the numerous reproductions of rare and interesting maps and charts of every age from Ptolemy onwards. The inset map at the end showing the tracks of explorers in Australia and the Western Pacific is most useful, and shows the routes taken by such men as Magellan, Mendana, Quiros, Torres, Tasman, Dampier, Bougainville, Cook, and Grant. The author opens with a reference to a Greek Utopia written in 350 B.C., and proceeds to discuss in a scientific and critical spirit of enquiry every possible reference to the Land of the South from that date onwards. The subject is a fascinating one, and the book is interestingly written. Each chapter is headed by a bibliography of the sources drawn upon, and the author acknowledges his indebtedness to the " admirable volumes of Professor Beazley on the 'Dawn of Modern Geography.' " Throughout the book there is evidence of a profound knowledge of the literature of the subject, and also of a quick intuition not only for the historical and geographical essentials of the story, but also for those illuminating bits of national and individual psychology which add so much of the breath of life to any such study. We quote an example from a discussion of the Spaniards and Dutch in their relation to the New World: " Complete and singular is the contrast between the Spaniard and his successor. It is the contrast of the Cathedral full of men with all human virtues and vices, and the Factory wherein is neither virtue nor vice, nor even men, but one thing only, the desire for money. . . . 'The Company,' our modern Dutch historian quaintly explains, 'gave as much attention to Christianity as could in reason be demanded from a man of business.' "

Der Bau der Erde. L. Kober. 46 figs and 2 plates. Gebrüder Bornträger. Berlin. 1921.

Kober briefly reviews some of the more important current theories of earth-structure. *Wegener's theory alone he rejects absolutely. His own position is broadly as follows.

Since the beginning of geological time, the earth-crust, taken horizontally, has had two main structural elements: (a) blocks relatively rigid, (b) relatively plastic zones lying between and around the rigid blocks. (a) and (b) differ essentially not in material but in structure. The primary force which produces movement in the earth's crust is earth contraction due to earth shrinkage. All other forces are secondary. Contraction leads to: (1) pressure exerted laterally by the blocks upon the plastic zones, (2) coalescing of some of the blocks, which thus tend to become rigidly cemented together and to form larger blocks, (3) collapse of some blocks or parts of blocks, (4) progressive deepening of the sea-troughs. (1) and (2) are due to horizontal (circumferential) shrinkage, (3) and (4) to perpendicular (radial) shrinkage; all four are evidences of "closer packing," of accommodation of fixed masses to less room.

(a) Existing continents are built up around cores formed by one or more rigid blocks. Though not, therefore, necessarily simple in structure, they are relatively permanent. From the dawn of geological time, in spite of occasional temporary, total or partial submergences, they have remained essentially continental areas. They resist, but are not immune from, alterations (bending, fracturing, etc.) arising from reflex pressure from the plastic zones.

(b) The plastic zones are regions of geological instability. They lie between and around the continental blocks. They may be about 3,000 km.—broad synclinal troughs with convex and highly irregular floors usually sea-covered (e.g., Kober believes that the present Atlantic is a typical rejuvenated orogenetic zone). Earth shrinkage takes place mainly at the expense of these zones: the blocks press inwards, the troughs exert a reflex pressure outwards. As pressure increases the troughs narrow and deepen, and finally the more plastic material on their floors is pressed over and over itself into folds. These folds lie chiefly along the continental edges where the pressure is primarily applied. The over-lapping folds slowly rise, accompanied by much volcanic activity, to form first submarine ridges, then island chains, and finally mountain ranges. Fold-mountains are thus composed primarily of overfolded strata, layer upon layer, but much complicated by fractures, volcanic intrusions, and numerous other subsidiary dislocations. The plastic zones are, therefore, termed "orogenetic," because they give birth to mountains. The resultant "folded-mountain" zone consists essentially of two flanking ridges which have mounted up and over the continental edges on either side and advanced by overthrusting. These flanking ridges move outwards in opposite directions and lie, as it were, back to back, their flanks which face continentwards being abrupt and sharply marked. Between them may lie other more or less parallel folds, and occasionally fragments of rigid blocks are caught up and raised as plateaux. Sometimes the flanking ridges are forced together, and here we have mountain-knots, as opposed to the diverging arcs of other sections. The synclinal troughs are compressed in this process to about one-third of their original breadth, and the orogenetic zones throughout the world shew a fairly uniform average width of about 1,000 kilometres.

Action begets reaction and the inpressing continental blocks suffer pressure from the orogenetic zones. Thus arise in the continents—especially in their marginal regions—a series of secondary disturbances which sometimes take advantage of older semi-obliterated lines of disturbance and rejuvenate earlier features. These are the continental features which play such a large part in determining the detailed shape of existing land-masses. Kober agrees with other geologists in likening them to the outer and outmost ripples of the great orogene waves. In a fascinating chapter the relation of these inner systems with the main fold lines is indicated for each continent, but we earnestly hope that the half-promised book elaborating this thesis will be written.

The heaping-up of vast piles of rock—albeit relatively loose and light—upon the continental edges causes these to sag, and, in fact, Kober conceives that 75 per cent. or more of the highly unstable Mesozoic orogene folded zones have collapsed and carried down with them large areas of continental margins, while in the Pacific it is possible that one or two blocks have foundered wholly. This breaking down process is accompanied by renewed volcanic activity distinct in its nature from that accompanying the processes of uplift.

The seas move sympathetically with earth movements—expanding as the folds rise in the orogenetic troughs (cp. spread of Cretaceous Sea), retreating upon the maximum continental uplift, and expanding again with the breakdown of the orogene fold-system. Thus the sea-filled orogenetic trough passes over by a cycle into a new orogenetic trough, and the seas are in fact largely permanent in position. But their permanence differs from that of the continental blocks: it is a permanence of change.

Kober's findings diverge fairly widely from those of earlier palæogeographers: in particular he denies that Gondwanaland and some of the other suppositious land-masses ever existed. He inclines to believe in an octahedral deformation of the earth, but the plane faces of the octahedron are not the oceans, but the rigid continental blocks. The edges of the octahedron are the orogenetic zones, and its medial plane is bounded by a sinuous line curving half of it to the north and half to the south of our equator—the north half being represented by the curve stretching from the Galapagos Islands via the West Indian, Alpine and central Asiatic fold-mountains to the Sunda Archipelago.

We have here daring generalisations based on slender evidence, and the lack of evidence is sometimes covered up by circularity of argument. None the less we believe that this new synthesis will profoundly modify the general outlook upon the problem of earth structure, and that acquaintance with Kober's views will become an increasing necessity for students of geography. O.H.T.R.

* See Mr Platt's article in this number.

Trusts in British Industry, 1914-1921. J. MORGAN REES. 269 pp. 22 x 14 cm. King. 1922. 10/6.

This is a very important book, not only for the student and teacher of economic geography, but for every citizen interested in the future good government of the industrial world. Statistics have been collected in a most thorough and painstaking way from hundreds of sources, and they are here clearly summarised and set forth in such a way that they can be readily understood by the non-specialist in economics, while copious bibliographies appended to each chapter make it easy for the student to follow out any special point that interests him. There are chapters dealing with the history of the movement towards gigantic combines in the trading world in the United States, Germany, and Great Britain, and showing the tremendous impetus given to this movement in the post-war years 1918-1921. Other chapters deal in detail with the extractive industries, iron and steel, textile, chemical, food and miscellaneous industries. The chapter on banking and finance contains much matter that will give food for thought. While every reader will not perhaps agree with the author's suggested solutions for the problems presented by the rapid growth of "trustification," yet there will certainly be unanimity as to the value of keeping the public informed by means of such books as to what is happening, and it is to be hoped that the book will get the wide publicity it deserves. It is specially interesting to note Mr Rees' opinion that the difficulties underlying the constant recrudescence of trouble in the coal industry are to a large extent geographical and geological, so that combinations which might be successful in Westphalia or the United States are not workable in Britain. Here is an opportunity for geographers to work out in detail the problems hinted at by our author, and to attempt to find a solution from the geographic standpoint.

Inheriting the Earth. O. D. VON ENGELN. New York. Macmillan Company. 1922. 379 pp. 20 x 13.5 cm. 9s.

This book ranges too widely and might only too easily be caricatured did not the author's evident earnestness forbid. On many points such as our western nationalisms, sometimes aggravated with imperialisms, tariff policies, exclusivisms, distribution of wealth, and so on, he is quite a left-wing thinker. With this he combines an evident passion for the ascendancy of the white race. Each region he thinks belongs to mankind; the best scheme for its utilization must go forward even if this means supplanting the original population. He would get the natives keen on selling things to us, knowing full well they would thereafter buy from us. Chinese coolies would be specially suitable for export to the equatorial forests to clear them and make settlements. The reviewer cannot but see another picture, that of the speculators from the temperate lands getting rich in money and poor in morals by controlling the toiling immigrants, one of whose many virtues, in the author's eyes, is that they would not clamour to be made citizens and would endure restrictions on marriage and so on. Our author forgets surely that we may in our haste destroy unappreciated assets that might be of use in the future to a permanent population in order to extract materials for the use of temperate lands by labour of a population of which we cannot be as sure as the author that it will really stand equatorial life.

The author is like a moth fascinated by the glare of "mass production," and readers may well think out whether his schemes are likely to produce the best men in the end. The references to native life are often open to criticism, and we commend the study of Professor A. R. Brown on the Andamans (see review) as a corrective, especially as regards sex questions. It were well also to weigh carefully the ideas of Vidal de la Blache against those of Ratzel when touching the reactions between man and place. With so much reference to the Chinese it is further unfortunate that there is not more appreciation in this book of the age-long civilization of China.

Junior Contour Exercise Book. FAIRGRIEVE and YOUNG. 25 x 18 cm. Philip. 1922. 9d.

This useful book should meet a need that has been felt for some time in elementary schools. The exercises have been carefully prepared in a graduated series from practical knowledge of the capacities and limitations of the child just beginning to try to read contour maps. A useful note giving the gradients of difficulty for men, motors, bicycles, carts, trains, etc., brings the exercises within the scope of realities familiar to the child, and suggests a practical application of them to the home region contour map.

The English Village. HAROLD PEAKE. Benn Bros. 1922. 252 pp., maps and diagrams. 15/-.

Into this book Mr Peake has put a great deal from years of study and wide reading in anthropology and archæology, as well as from practical experience as a resident in an English village giving a great deal of his time to the service of the public in his district. The anthropological introduction will attract many readers from its indications of the bearings the study of even the most remote past has on present-day problems. Seebohm in his study of the village community supposed that a pre-Roman basis was largely reorganised by the Roman conquerors, though there are indications that he saw we might some day gain more knowledge of that pre-Roman basis. Mr Peake's work takes us a good way towards the realization of that additional knowledge, and he makes it seem probable that the village community is in a considerable measure the work of the men of the Bronze Sword, whose migrations and, probably, conquests are being traced by studies of archæological distributions, in which Mr Peake is an acknowledged leader. Mr Peake gives details of what he calls a Valley Village, a Forest Village, and Squatting Village on the edge of a heath, and it is to be hoped that students in many districts will utilise Mr Peake's work as a basis without supposing that his types necessarily apply to other regions. He himself has shown that in Wales, for instance, the village is more an aggregate after the fashion of a town than a village in his sense, i.e., a community coming together for agricultural purposes. He gives an interesting summary of the story of the agricultural village community, and characteristically applies his knowledge at the end to the problem of the present day organisation of population and its much-needed betterment. This is a book no teacher interested in his own district should miss; it will help him to see points around him which might escape his notice, and indeed the wide use of this and allied books by teachers and senior pupils might help not a little to lessen the catastrophic depopulation of country districts now so actively in progress.

Traité Comparatif des Nationalites. A VAN GENNEP. Paris, Payot, 1922. 228 pp., 23 x 14 cm. 8 francs.

Vol I. of this work deals with what are called external elements of nationality, which idea it is at great pains to dissociate from that of the State. Nationality is treated as a comparatively modern form of group consciousness which is claimed to be very old, but nationality is nevertheless shown to be not so modern as is sometimes imagined, for the author quotes tributes to the ideal of self-determination of peoples from the Poland of the 15th century, as well as from French politics of the same period.

Minor group-marks include costume, festivals, house types, and so on. In connection with the last named subject he pleads for surveys which we wish branches of the Geographical Association would take up, surveys of the plans of simple rural houses as well as of the materials of construction. The author does not think Brunhes satisfactory on this point, and his criticism of Cvijic on Balkan houses is very severe. Alphabets are another form of group mark, and here (p. 63) the author makes two mistakes—the Serbs use Cyrillic script and the Croats and Slovenes Latin script; the Welsh people use Latin script. The author states the contrary.

The criticism of linguistic censuses and maps is trenchant but healthy, and one is glad to note an appreciation of B. C. Wallis' efforts to improve matters here. But the author is rather out of perspective when he suggests that languages were fluctuating until the 19th century; language boundaries have changed only in detail since market towns became an established feature of European life, save in the case of the Celtic fringe so deeply affected by administrative severities.

A thoughtful section on frontiers shows keen study of English writers, Curzon, Lyde, Holdich, Unstead, Fawcett, Freshfield, Brigham, Semple, and others. He uses frontier for a limit whether linear or zonary, and insists on the differences between frontiers for different purposes.

One may in conclusion draw attention to two French books which should be widely used by teachers of geography and which he quotes continually:—

Meillet. "Les Langues dans l'Europe Nouvelle." Paris. 1918.
Auerbach. "Races et Nationalités d'Autriche-Hongrie." Paris. 1917.

The Antiquaries Journal, Vol. II., No. 3 (p. 240), contains a new treatment, on geographical lines, of the famous subject of "Coldharbours" by LIEUT.-COL. KARSLAKE. The author rejects the view that Coldharbour is a corruption of some Latin or Celtic word. He also doubts whether any "Coldharbours" occur near enough to a Roman road to sanction the hypothesis, even for some cases, that the term was used as a name for rough shelters for travellers among ruins left by the Romans. No Roman materials have been found in any Coldharbour. Coldharbour is a name applied usually to farm buildings usually a mile or more away from a town or village; sometimes we know that the town or village was once a Romano-British settlement. When Coldharbours occur away from a settlement, they are found, for example, on the marshes of Thames and Medway estuaries, round the original ruin of the Wash or on and around Romney Marsh. A map of 150 Coldharbours shows their occurrence chiefly in Kent, Surrey, Hants, Wilts, Middlesex, Hertfordshire, Buckinghamshire, and Oxfordshire, with outlying cases in the south-west, in Lincolnshire, etc. From a study of the case (Coldborough) at Lambourn, the author concludes that the name means a winter shelter for cattle, probably with a barn for storage of fodder. This view makes it easy to understand the Coldharbours associated with the great harbours above mentioned. Names like Broadway, Round Oak, Summerlug, Beggars' Bridge, Gibbet, Hundred Acres, Inhams, Starveall, Little London, are often found near Coldharbours.

The discussion which followed Col. Karslake's paper brought out a very large measure of agreement with Colonel Karslake's interpretation of Coldharbour. His further view that they are associated with Gaulish polygonal settlements was apparently held to be not proven, though he claimed to show interesting coincidences of distribution and other evidences. The paper should be read in the "Antiquaries Journal," which our readers should encourage local libraries to take for its valuable help to all who are interested in working out the evolution of British life. Its price is 18s. 6d. per annum, and it is published for the Society of Antiquaries of London by the Oxford Press.

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GEOGRAPHY.

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Particulars of Courses beginning in October, 1922, for Students of Geography, including those for the Diploma in Geography, may be had on application to the Secretary, University of London, University College, Gower Street, W.C.1.

Permanent Committee on Geographical Names for British Official Use.

It has long been recognised that much inconvenience has been caused by the great variety of ways in which foreign place-names are spelt by British writers and map makers ; and accordingly steps have been taken to lay down definite spelling for these names.

A. Constitution of the P.C.G.N.

The Permanent Committee on Geographical Names was formed in April, 1919, at the request of the Admiralty, in order " to examine cases of doubtful geographical nomenclature and spelling, and to prepare authoritative lists of names, as required, for British official use."

It consists of representatives of the Admiralty, War Office, Foreign Office, India Office, Colonial Office, Board of Trade, Ministry of Agriculture, Post Office, Royal and Royal Scottish Geographical Societies, under the chairmanship of one of the members of Council (at present a Vice-President) of the Royal Geographical Society.

The above Government Departments have agreed to accept the spelling laid down by this Committee, and it is hoped that by this means the correct spelling, thus standardised, of place-names will gradually be adopted by all writers, teachers, map-makers, the press, and the public.

B. Work already done.

Since its inception the Committee has produced and printed :—

1. Rules for the spelling of geographical names for British official use (termed the R.G.S. II. System), whereby the sounds in foreign languages may be, as nearly as possible, transcribed into a uniform alphabet.

2. First general lists of names, with their correct spelling, pronunciation, foreign and other variants, etc., as follows :—

European	...	about 300 names.
Asiatic	...	about 200 names.
African	...	about 250 names.
Oceanic	...	about 300 names.

3. First list of names (about 500) in Tanganyika Territory, published after reference to the local authorities for the purpose of obtaining the correct spelling according to local pronunciation.

4. First list of names (about 300) in 'Iraq, Mesopotamia.

Similar lists of names in Gold Coast, British Togo, Nigeria, British Cameroons, and Australian and New Zealand Dependencies have also been drawn up and referred to the local authorities. It is intended to continue drawing up and publishing lists of further names in Europe, Asia, Africa and Oceania, all those in the British Empire being referred to local authorities before publication.

(The above lists are to be had (price 6d. each) from the Royal Geographical Society, or from Edward Stanford, Ltd., 12, Long Acre, W.C.2; Sifton, Praed and Co., Ltd., 67, St. James's Street, S.W.1; George Philip and Son, Ltd., 32, Fleet Street, E.C.4.)

In addition, a pamphlet has been published, as R.G.S. Technical Series No. 2, entitled " Alphabets of Foreign Languages transcribed into English according to the R.G.S. II. System " (price 7/6; to Fellows R.G.S., 6/-). By means of this the pronunciation of any name in some fifty languages can be ascertained.

C. Expenditure on the P.C.G.N.

The expenditure incurred in publishing the above falls under two heads only :—

1. The Assistant's salary.
2. Printing and paper.

The remainder of the work is carried out on a voluntary basis. This expenditure has so far been met by a small grant (£750 altogether) made by H.M. Treasury to start the work, and by a subscription (£300 altogether, to cover the publication of " Alphabets of Foreign Languages ") on the part of the Royal Geographical Society. The above sums, with the help of a few private subscriptions, have carried on the work up till now; but the Treasury has declared its inability to continue the grant, and the Royal Geographical Society—which, in addition to its subscription, has provided house-room, stationery, postage, the assistance of its Secretary, etc., etc., free—is not able to provide further pecuniary assistance.

It would be a great pity if this valuable work—now in full swing, and undertaken for official purposes and for the benefit of the whole of the English-speaking world—were allowed to lapse for want of funds. The correct spelling of many thousand more place-names has still to be decided, and especially is this necessary at the present time, when so many nations, colonies, and boundaries are, even now, still only in the process of settling down.

An appeal made to various scientific societies, commercial firms and other interested bodies, and to the general public for pecuniary contributions with which to continue the work, has met with but a meagre response; and it is therefore sincerely hoped that those interested in geographical and geographical educational work (and especially the readers of the "Geographical Teacher") will come forward to keep the Committee and its valuable work going.

It need hardly be pointed out that for the research work necessary it is essential that the Assistant should be well acquainted with numerous languages and foreign scripts, and such men cannot afford to give their time for nothing. The printing and paper are exceptionally costly now.

An annual income of at least £500 per annum, for five years, is therefore being aimed at, and this sum will barely, it is considered, suffice to cover the salary of the Assistant and the cost of printing.

Subscriptions (annual, if possible) should be sent, and cheques made payable, to the Assistant, Permanent Committee on Geographical Names, Royal Geographical Society, Kensington Gore, S.W.7. Even small amounts will be very welcome.

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SPRING 1923.

EDITORIAL.

IT is proposed to hold the Spring Meetings of the Geographical Association at Shrewsbury on March 23rd and 24th. The provisional programme will include a walking tour around the fine old town on the Friday afternoon, a meeting of the Council of the Association at 5-45 p.m., a public meeting to be addressed by Principal J. H. Davies (one of the Association's trustees) at 8 p.m., and a lecture by Sir John Russell, F.R.S., President of the Association, on Saturday morning at 9-30 a.m. Principal Davies' subject will be "The Discovery of Wales at the end of the Eighteenth Century." Sir John Russell will speak on "Soils," with special reference to the district. After the Saturday morning lecture there will be a charabanc excursion, weather permitting, to Uriconium, Buildwas and Much Wenlock, so that visitors may see something of the Severn gorge, the Wenlock Edge, and the historical geography of this interesting region.

THE Association offers its thanks to Lord Edward Gleichen for his help in bringing before us at the Annual Meetings in London, the work of the Permanent Committee on Geographical Names. This Committee is doing its best to negotiate a standardisation of names used on maps and in geographical work. It is obvious that teachers especially should do their utmost to press for use of the standardised names in atlases and text books which are offered for their use by publishers. The lists issued by the Committee should be filed and bound in every school which takes Geography seriously. For convenience of members we subjoin the catalogue of lists thus far issued. They may be purchased in the ordinary way or direct from Messrs. Stanford (12, Long Acre, W.C.2), Sifton Praed and Co. (67, St. James' Street, S.W.1), or G. Philip and Son (32, Fleet Street), price sixpence each, postage extra.

First List European Names.
Second List European Names.
First List Asiatic Names.
First List African Names.
First List Names, Tanganyika Territory.
First List Names, Iraq (Mesopotamia).
First List, Oceanic Names (Foreign Dependencies).

The Committee has also a valuable work entitled, "Alphabets of Foreign Languages," translated into English according to R.G.S. II System. The price is 7s. 6d. net, or to Fellows of the Royal Geographical Society who purchase at the Office of the Society, 6s. 0d. net, postage extra.

WE are glad to be able to report that the Universities of the country are rapidly coming into line in the matter of courses in geography. The latest developments are as follows:—

The Council of the University of Manchester has decided to recommend to the University Court the institution of an Honours School of Geography within the Faculty of Arts. Further questions are under discussion.

The Senate of the University of London has resolved that Geography will be added to the list of subjects which may be taken at the B.Sc. Pass Examination for external students. This University has already recognised Geography in the Faculty of Arts.

The University of Bristol has resolved that Geography be added to the list of subjects which may be taken for the B.Sc. Examination as well as for the B.A. Examination. The latter decision was taken some time ago.

IN September, 1923, it is proposed to hold an International Summer School in Vienna on the lines of the successful school held there in 1922. Intending students should write for particulars to Dr. Georg Tugendhat, Hon. Gen. Secretary, Vienna Summer School, London School of Economics, Houghton Street, Aldwych, London, W.C.2. We understand that there will also be a Summer School at Geneva; details may be obtained from the League of Nations Union, 15, Grosvenor Crescent, London, S.W.1. These schools should prove of special interest to geographers, who cannot but be interested in the development of international points of view.

OUR grateful thanks are offered to Mr. H. Batsford for his gift of a book, "Heart of Europe," by R. A. Cram, and to Dr. Vaughan Cornish for presentation of his valuable works, "Waves of Sand and Snow," "The Strategic Geography of the Great Powers," "The Travels of Ellen Cornish," "The Panama Canal and its Makers." At the same time we have pleasure in offering our congratulations to Dr. Vaughan Cornish on his election as President of the Geographical Section of the British Association for its Liverpool meeting (September, 1923). We hope that he may be strongly supported by members of the Geographical Association there.

THE Library of the Association continues to grow, and a re-issue of the Catalogue was made in January. About 80 further members of the Association have joined the Library since the New Year, making a total of over 360 utilising this scheme, and the number of borrowings in the short period since the library re-opened has reached nearly 350. The Library is still growing, and the scheme has proved itself to be both sound and useful. It is obvious that the Library is as yet only a nucleus collection, and its usefulness justifies us in appealing to members to try to secure gifts of money or of books for its enlargement. Any possibilities of bequests should be considered seriously. We need a large sum to make the Library permanently valuable, and if we can but secure this it will of itself open up opportunities for improvement of the work of branch study circles and of this Magazine, and so help the whole Association. May we appeal specially to any one interested in the improvement of international relations to help us with gifts of books or money towards improving the Library for the use of teachers anxious to spread true knowledge about the life and problems of other peoples?

It has been specially helpful to get small donations from members both for the improvement of the Magazine and for the increase of the Library. These donations have a large cumulative effect, and are encouraging us to try to make the "Teacher" an illustrated magazine.

THE present depressed state of education makes it specially incumbent on us to do our utmost to see that geographical teaching does not suffer. An extra spurt of enthusiasm and hard work is the more important at the present juncture in that what is most necessary for a general revival of confidence and peace is the dissemination of truth about the peoples of the world and their problems. We have suffered much from the study of other peoples of the world only in relation to ourselves, as readers of many text books of geography and of history, need not be told.

May we also invite members to consider seriously any ways and means for bringing out the bearing of geographical study on business life? We feel sure it would greatly help the geographer in his economic studies to feel himself in closer touch with the actualities of commercial exchange, and we believe that the serious geographical worker could often be of value to the business man, both directly, for advice, and indirectly, for training up the people who are going into business. We will venture one suggestion in conclusion, and that is that our branches in big cities should use every opportunity for getting into closer touch with the Chambers of Commerce in their cities, and might try to arrange for discussions of ways and means to develop greater mutual helpfulness between those Chambers of Commerce and ourselves.

AT the second meeting of the International Research Council at Brussels in July, 1922, the delegates of the National Committees of Geography for Belgium, the British Empire, Italy, and France, agreed to found an International Geographical Committee on the model of the analogous committees for Geodesy and Geophysics and Astronomy. It is considered certain that the United States of America will join the movement, and that most of the member-states of the League of Nations which are able to form a Geographical Committee will do the same. This will mean the formation of a permanent international group promoting co-operation in research and organising future congresses of geography. Prince Bonaparte, representing France, was chosen as President, General Vaccheli (Italy) as Vice-President, and Colonel Sir C. F. Close (Britain) as Honorary Secretary. All British geographers will feel honoured that Sir Charles Close has found it possible to accept this duty for the International Committee, and will be glad to take any opportunity of helping him in his task.

IT is proposed to found an Annual Prize in Geography, to be awarded in connection with the General School Examination of the University of London, as a memorial to the late Mr. A. T. Simmons, for seventeen years Inspector of Secondary Schools in the University. Many teachers of geography, mathematics and science in such schools will remember with pleasure the help and guidance he was always ready to afford them, and some would wish to be associated with the suggested tribute to his memory. The undersigned have kindly agreed to receive and acknowledge contributions, which should be sent before April 1st.

S. Elford, Esq., M.A., Coopers' Company School, Tredegar Square, London, E. 3.
Miss Frodsham, St. Saviour's and St. Olave's Grammar School for Girls, New Kent Road, London, S.E.1.
Miss Grainger Gray, Sandecotes School, Parkstone, Dorset.
C. H. Peters, Esq., B.A., The County School, The Green, Tottenham, N.17.
A. T. Warren, Esq., M.A., Southgate County School, Fox Lane, Palmers Green, N.13.

THE Editor regrets that owing to lack of space he was unable to put in a report of the very successful Swiss tour undertaken by the Association in 1922.

AN index to Volume II has been prepared through the kindness of Mr. W. E. Whitehouse, and copies will be sent to any members who send their name and address and a penny stamp.

THE GEOGRAPHICAL ASSOCIATION.

ANNUAL REPORT FOR 1922.

THE membership roll stands at 4,462, excluding all members in arrears of subscription. The total thus shows a welcome continuation of the growth that has occurred year by year—996, 1,458, 2,379, 3,965, 4,159 being the figures for the five previous years. There are now 67 branches and affiliated associations, and the number is still on the up grade. We greatly hope that improved travelling facilities and a beginning of the much hoped-for economic revival may help our branches in the serious difficulties against which so many of them are struggling. The best thanks of the Association are offered to the Rt. Hon. Lord Robert Cecil for his address, published in the Geographical Teacher for Spring, 1922, and for the encouragement which his great international position and work gives to educational workers. It is a pleasure to welcome as his successor Sir John Russell, D.Sc., F.R.S., Director of the Agricultural Experimental Station, Rothamsted, whose Soil Surveys have made him well known to geographers, and whose breadth of scientific outlook and enthusiasm make him such a valuable friend of research and education on geographical lines.

The outstanding event of the year in the public work of the Association has been the happy ending of the long discussion with the Board of Education about Geographical work in the upper forms of secondary schools. The Board has now sanctioned courses with Geography as a central subject under wise conditions, and the Association offers its hearty thanks for this new arrangement. It is now for us to make a fresh effort under the improved conditions to deepen and to enrich our teaching of the subject. What is most wanted is serious study and wide reading and freedom from bias of every kind; we need to set forth the truth about men's problems in all regions, and may be assured that nothing will help so much to diminish the prejudices which are the incubus of our world at present, as the sheer truth and the endeavour to look at the problems of men in each region from their own point of view as well as from that of mankind in general in so far as we can.

Almost as important as the improvement in position in the secondary schools is the steady improvement in the position of the subject in the universities. One after another is coming into line and agreeing to recognise geography in both faculties, as has now been done in several (London is the latest recruit here), or to give it a special school of its own as Cambridge has done. Further negotiations are in progress, and by next year we may well hope to report at greater length on this subject. If this development is to become really fruitful we should try to press the claims of geographically trained graduates for positions in the business world.

In order to further the above developments in universities the Association entered into arrangements with publishers for facilitating the production of research matter of a geographical nature. The arrangements made without financial risk (or possibility of profit) to the Association have had a considerable measure of success already, and should develop a great deal when the period of depression passes away.

Last July the Council of the Association entrusted to Miss Fleming the duty of reorganizing its postal lending library. This Library stood at only about 160 books actually in hand, and a special effort resulted in the re-opening of the circulating system on October 1st with 420 books included in the new catalogue. Since then another 52 books have been added. The number of members of the Association who have joined the Library is 286, and the number of book borrowings in the first 80 days of the Library's new life has been 244, showing very clearly that the effort has met a direct need. May we ask friends of the Association to remember that 500 books is the merest nucleus of a library, and that they could help most materially by endeavouring to secure gifts and bequests of money or of books for this important aspect of our work. Our warmest thanks are offered to those who have already helped; their gifts have been and are being acknowledged in the Magazine.

The appointment of Dr. Unstead as a Professor of Geography in the University of London at the Birkbeck College is an event on which the Association congratulates both the University and its new Professor, whose services to the Association are deeply appreciated. The termination of the interregnum at Manchester by the appointment of Mr. W. H. Barker to a Readership in Geography there augurs well for the future. The indisposition of both Mr. Fawcett and Professor Roxby is an unfortunate weakening of our forces, and we hope that what it is to be feared are the results of overwork in these two cases may soon pass away.

The addresses of Dr. Marion Newbigin to Section E, of Mr. H. J. E. Peake to Section H, and of Sir R. A. Gregory to Section L of the British Association in 1922 were all valuable to those who are working for geography in education, and we offer our Association's thanks to those three valued friends, as well as to Prof. J. L. Myres, the Senior General Secretary of the British Association, for much help in many directions. The appointment of a special committee of the British Association to consider the scope and content of geographical teaching is a very valuable step at this juncture.

The Spring Meetings of the Council and the Association were held at Leeds, Bradford and York in 1922, and the Association thanks the Yorkshire Branches for their hearty welcome and great efforts. A special tribute to Mr. Fawcett must be added.

Mr. Lupton has organised most energetically the Touring Committee of the Association, and is adding a whole new sphere of usefulness to the Association, one making for a greater depth and efficiency in geographical teaching. The probability of important developments in educational travel outside Britain is encouraging to all who care for educational betterment and the promotion of international knowledge.

Mr. Spary has done valuable work for the Exhibitions Committee and for the improvement of the arrangements for our Annual Meetings, and the Association is much indebted to him.

The Branches of the Association have continued to develop in spite of all difficulties, and several have taken up and pushed forward special efforts they have chosen for themselves. Some have taken up special work on local problems, some have prepared and discussed syllabuses which take local considerations into account, some have worked out studies and map exhibitions of selected regions, such as Kenya Colony, and many have co-operated with the sister Associations for Classics, History, Science, Mathematics, etc., to hold joint discussions.

It is through the honorary efforts of our branch secretaries and other officers of branches that the Association maintains itself and does its chief work, and this report should not close without a special word of gratitude for all they have done and are doing.

ANNUAL BALANCE SHEET, 1922.

Receipts.	£	s.	d.	Expenses.	£	s.	d.
Balance from 1921	35	12	3	Typewriter and Duplicator	52	8	0
Returned by Insurance Co.	0	0	11	General Printing and Stationery	125	18	7
Interest on Investments	61	5	0	"Geographical Teacher" 3 nos.	440	4	7
Touring Committee Balance	45	0	0	Library Expenses	117	3	7
Advertisements	158	0	7	Office ,, ...	42	0	9½
Sales	85	5	8	Subventions	96	3	11
Gifts	24	15	7	Insurance	1	3	6
Subscriptions—Current	747	0	0	Refund of Subscriptions, &c.	1	8	1
Subscriptions—Advance	122	17	8	Annual Meetings	19	10	0
Library Subscriptions	151	11	6	R.G.S. Committee on Geographical Names ...	1	1	0
Refund of Library Postage	3	19	10	Postage, &c.	194	10	4½
				Wages	64	15	0
				Clerk's Salary	246	13	4
				Bank Charges	1	16	0
				Officers' Expenses	12	0	0
				Addressograph	13	3	1
				Balance	5	9	2
	£1435	9	0		£1435	9	0

CAPITAL ACCOUNT, 1922.

Receipts.	£	s.	d.	Expenses.	£	s.	d.
Balance from 1921	109	18	2	By Purchase of 5 per cent. War Loan ...	137	18	9
Life Compositions	92	15	0	Expenses of Transfer of Trustees	0	10	6
Interest	0	17	9	Balance	65	1	8
	£203	10	11		£203	10	11

INVESTMENTS HELD ON BEHALF OF GEOGRAPHICAL ASSOCIATION.

£1,100 of 5 per cent. War Stock 1929-47, of which £240 is devoted to the Herbertson Memorial Fund. REMAINDER £860

THE INFLUENCE OF GEOGRAPHICAL FACTORS ON THE AGRICULTURAL ACTIVITIES OF A POPULATION.

PRESIDENTIAL ADDRESS DELIVERED BY SIR JOHN RUSSELL, D.SC., F.R.S.

I PROPOSE to-day to show how the agricultural activities of a population have been affected by the geographical factors of position and altitude, which determine rainfall and temperature, and by soil, which, though not a geographical factor, is a product of geological, meteorological and topographical factors so closely linked up with geographical factors that separation is impossible. The case we shall consider will be that of England, and I shall hope it is not to you the unknown country that it is to the average audience.

Agricultural activities in all ages have centred mainly round the growth of crops, which is dependent on suitable moisture, temperature, and soil conditions. Two simple rules must be borne in mind: (a) dry conditions are favourable to grain production and wet conditions unfavourable; conversely, wet conditions are favourable to grass production and dry conditions unfavourable; (b) for technical reasons very light sandy or gravelly soils and very heavy clay soils involve great risk of failure of crops, and are, therefore, unsuitable for crop production, while soils varying from light loams to medium and heavy loams are much more suitable.

The nature of the connection between agricultural activities and geographical factors has varied in the course of our history. In the early days, and almost up to the beginning of the 19th century, transport facilities were so poor that each village community had to be almost entirely self-supporting. This necessity for producing all the requirements of life gave to the system of agriculture a certain degree of uniformity all over the country, and at the same time reduced it to its simplest state. The things to be obtained were bread, beer and meat, in smaller or larger amounts.

The broad outlines of the system were therefore everywhere the same, but the effect of geographical conditions was very marked.

Probably the most potent single factor in determining the harvest is the rainfall. It is well established that wet summers and autumns are disastrous to corn crops, especially wheat and barley. A wet summer is only an annoyance to us, but it often meant terrible, agonizing suffering and long drawn out death to our ancestors; many of the old country sayings embodying their long and bitter experience still survive. Wet summers caused the appalling famine of 1315—1317, and a search through the old chronicles of Holinshed or the more modern Record of Seasons and Prices by T. H. Baker, shows clearly the connection between dry summers and bountiful crops on the one hand, and wet summers, bad crops, and famine on the other. "Drought never bred dearth in England," the old proverb went, but on the contrary wet seasons did. Any part of England is sometimes liable to wet summers, but some parts are especially liable to them. In these districts the harvest of wheat and barley was always uncertain. This serious difficulty was met in two ways:—

1.—Other crops besides wheat were grown for bread. Oats and rye both withstand wet weather better than wheat, and were—and still are—

grown in preference to wheat in districts liable to be wet. Beans also tolerate wet conditions, and were often used for bread, although they were disliked.* Mixtures of grain were sometimes sown, and still are.

2.—The difficulty in getting a living in wet regions being so great, these regions were always thinly populated, poor, and therefore usually backward; no one lived in a wet region if he could live in a dry one; those who had no choice died down till the proper density of population was reached. The " lordly ones " of the earth—dignitaries of the Church and Barons,—moved to the drier districts, and with them went wealth and progress. In many parts of the country the rainfall map gives the key to the distribution of monasteries, abbeys and wonderful churches—the signs of wealth (mainly agricultural) in mediæval times,—and to the magnificent Jacobean and Georgian residences which indicate the agricultural wealth of later days. A journey up the west side of the Pennines, where the rainfall is high, and on the east side, where it is low, still shows the great differences. The drier eastern side has such evidences of wealth as Ripon Cathedral, Jervaulx Abbey,† Easby Abbey, Eggleston Abbey, Middleham and Richmond Castles, and a number of beautiful village churches, such as that at West Tanfield, with its wonderful tombs and magnificent gateway; and beautiful old villages such as Ripley. The wetter west has, of course, the grander scenery, but even in these days it is neither wealthy nor closely populated, and anyone who has been caught in a rainstorm, say between Sedbergh and Kendal, or between Sedbergh and Hawes, would sympathise with the choice of the men of old.

A further illustration is afforded by the western slopes of the Cambrian mountains as compared with the much drier eastern slopes. In travelling eastwards from Aberystwyth the wet western slope is even to-day thinly populated, with unattractive villages, churches nearly devoid of architectural splendour, and chapels entirely so. It is a land where Nature gives but little, and that only after much persuasion, and there was in byegone days little margin of time or substance to devote to the finer arts of life. Soon after the divide is passed a drier country is entered, and beyond Rhayader, in descending, whether by the Wye Valley or to the east, one comes to a richer and more densely populated country, where crops grow well, and men therefore lived well, with ample leisure to build themselves beautiful villages, manors, castles and churches, so that we find wonderful towns like Ludlow, Hereford, Leominster; magnificent manor houses like Shipton, Delbury, Elsich, Sutton Court, and others in the fertile Corvedale; highly attractive villages like Much Wenlock, rich in its abbey and church, town hall and old houses; remarkable churches as at Kington—a land where men had respite from the struggle and time to cultivate the arts and graces.

The effect of soil is equally marked. The two factors, however, are not independent. The soil is intimately linked up with rainfall; the two fit together as a key fits a lock. Under a given rainfall a clay soil is wetter than a sandy soil, and therefore sooner passes the margin of easy cultivation.

This difficulty was met in the old days by throwing the land up into ridges, from which the water drained more or less thoroughly into the furrows, giving the crop some chance of life on the higher parts, but not much on the lower parts. Many of these still survive, although the land has long ceased to be arable; some of the oldest are like an elongated S; others are straighter.

Even with this device, however, life in a clay district must have been very laborious, and at best the crops were uncertain; there was always the tendency for the more intelligent people to avoid it and leave it to the others; everything was therefore done on a poorer scale than on the better loams, and this poverty showed itself in a number of ways. The parishes on the clay are large; for example, in S.W. Sussex, Kidford, Petworth, Tillington, Lurgashall on the Weald clay much exceed in size those on the richer sand and chalk loam terrace, such as Stopham, East Dean, Duncton, Selham, etc. The roads were shockingly bad,‡ and it is not surprising, in view of all the circumstances, that the inhabitants of the Weald clay were very backward; the "round frock farmer" was the term of reproach applied to them when they came into the market. This was true not only of Sussex, but of Kent as well. Young, in 1784, states that the Weald is "under very bad management," and contrasts it unfavourably with the better farmed sands and loams. Marshall, in 1798, rates the farmers soundly: "Of the state of husbandry I have only to say that there were many foul lands in the parts I went over . . . that the hedgerows were far too high, wide, and impervious to the winds, for a low, dirty arable country." A vivid picture of the labourers and farmers in a clay district as late as 1840 is given in Hoskyns' "Talpa, the Chronicles of a Clay Farm."

We have all heard the pithy summaries of the characteristics of neighbouring districts or even counties that have passed into proverbial English, such as "Silly S——— (I will not offend the susceptibilities of my audience by filling in the blanks). These commonly arise from conditions such as soil and climate, which have attracted or repelled intelligent people for long generations, with the inevitable results.

Where the clay was still more intractable, even the cheap labour of the "round frock" could not make a living from it, and so it was left alone, and reverted to or remained in woodland. Much of this still persists. I have examined the soils of some of the woods and coppices of Hertfordshire, Kent, and elsewhere, and find them all difficult and some hopeless from the agricultural point of view. An excellent example is furnished by the woods north of Canterbury; in the tract traversed by the Watling Street at Dunkirk, and stretching away past Blean to the N.E. to the Herne Bay road, is a series of woods fringed by the fertile Graveney marches to the north, the Stour Valley to the south, the rich lands of Hoath and Chislet on the east, and others on the west. But this piece of London clay is so heavy and intractable that it has remained uncultivated, an island of waste, surrounded by some of the most intensive farming in the kingdom.

The little coppices still surviving on the tops of hills in the south of Hertfordshire and the north of Middlesex, e.g., South Mimms, etc., are patches of London clay capping the high ground and too difficult to be worth cultivating.

Gravelly and very light sands have proved unattractive to cultivators, and are often left severely alone. There is generally some reason when land is left as wood, waste, or common, and the experience of generations of cultivators has been that they cannot in a year's work obtain from such land a year's food.

Our general conclusion is, then, that under mediæval conditions the necessity for each village to produce all it needed imposed a uniform system of husbandry, which, in its essentials, was independent of the geographical conditions of soil, climate and topographical position. Nevertheless, these conditions largely dominated the agricultural activities of the population, determining whether they should live on wheat, rye or oats, fixing the density of the population and settling the question whether they were to have any leisure after the serious business of bread-winning was over.

To the general rule that the old system of husbandry had been in its essentials uniform throughout the country, there had been exceptions. The ordinary English farmer has a great love of animals, and with very little encouragement will devote much of his time to them. In the 15th and 16th centuries—between the time of the Black Death and that of Elizabeth, there had been an enormous development of sheep farming in the country. Unfortunately the system in vogue was entirely grazing; the land was laid down to grass and ceased to produce human food. The farmer could produce sheep or human food, but not both. Sheep will thrive under somewhat severe conditions, especially if they can keep their feet dry, but they do not flourish where they are liable to get their feet wet. They proved very successful on the uplands of the chalk and the oolite, and other regions where they could be dry under foot; the farmer and the wool merchant made much money. The marks of their prosperity still persist in the wonderful 15th century churches, manor houses, farm houses, and villages scattered all along the oolite ridge from the Cotswolds to Lincoln Heath and Cliff. It was perhaps only natural that in these conditions the farmers produced wool and not human food; hence the country-side tended to become depopulated, with results in Tudor times familiar to you all.

Specialisation in farming in mediæval times was lucrative to the individual but disastrous to the village community; the safe course was the uniform simple scheme of human food production already described.

A great change in the relationships between agricultural activities and geographical conditions began at the end of the 18th and the beginning of the 19th centuries.

Two factors were at play. The technical difficulties of combining animal husbandry with human food production had been solved largely through information brought back by Royalists exiled in the Cival Wars, and compelled to spend time in Flanders, where they saw a system of agriculture that furnished the key to the problem. And, further, the development of transport facilities in these islands in the first half of the 19th century made possible for the first time the exchange of agricultural products, a process which encouraged specialisation in agriculture. Instead of struggling hard, and often in vain, to grow corn crops in unsuitable conditions, a farmer could grow other things, and exchange them for corn. Thus began the process of specialisation to conform to natural conditions, which has continued ever since. We have no time to trace its history, but must take the results as they appeared just before the war.

The most striking effect is that of rainfall determining distribution of wheat, which, as already mentioned, is one of the most sensitive of crops to wet conditions. A line drawn from Durham to the Isle of Wight, and bulging to the west to take in parts of Cheshire, Shropshire, and Herefordshire, divides the country into two parts—an eastern part, where on the whole the rainfall is less than thirty inches, and a western part where on the whole it exceeds 30 inches. The crop maps show that wheat is far more important in this eastern part than in the western. Barley shows a similar distribution; but, on the other hand, grass is very tolerant of high rainfall; it is, therefore, much more important in the west than in the east.

In view of its special properties a clay soil in the midlands or west must inevitably be left in grass. Now grass necessitates some kind of live stock. If it is dry, sheep will flourish, as we have already seen. If it is wet they will not, but fortunately cattle may thrive, for they require much water, and do not suffer on wet ground as sheep do. As we all know, grass grows much more vigorously in summer than in winter, and hence there is a further specialisation; the animal population is mainly restricted to the summer. Many of the animals are fatted for sale to the butcher before late autumn, but the rest have to be maintained during the winter, and this necessity would gravely limit the carrying capacity of the grass lands if it could not be overcome.

Fortunately the arable farmer in the eastern counties, who specialises in corn crops, needs cattle for manure making; but as he has less grass than the west country farmer he cannot keep many cattle during the summer. He can, however, maintain them through the winter in his farm buildings—not in the open,—feeding them on his turnips and clover hay, but he has to fatten and sell them before these crops are exhausted; he becomes a specialist in cattle, but in winter cattle only.

There is a third type of specialization—one of the oldest we have. Farmers in favoured regions of the country do not want to be bothered with the rearing of calves, which is a slow and not very lucrative business, and so this is left to the men in high wet regions of the west and the north of England or the wet parts of Ireland, where the grass will not fatten adult animals. Thus the bullock has two or three stages in life under our specialized system; he begins on the hills in the west or north, or in Ireland, and, reversing Horace Greeley's dictum, he " goes east "; at two or three years old he travels to the good grass of the west or centre of England; he may then be quite fat by the end of the summer, in which case his life's work is done; or, if he is not fully fat, he goes further east to the yards of Norfolk to be finished at Christmas, or Easter at the latest.

There is also specialisation of sheep husbandry. Many sheep make the same eastward journey. Herdwicks are born in the higher parts of the Lake District, and at two, three, or sometimes four years of age, are drafted east to the richer lands of the Eden Valley and elsewhere; Ryelands and Cluns are born on the hills of Radnorshire, and go east to Shropshire, while from the S.W. of England trainloads of sheep are sent regularly to the sands of Surrey and Sussex. There is, however, a large amount of breeding in the eastern and south-eastern counties.

But the main feature of sheep specialisation arises from their suitability to light land because of its dryness; to sandy soils in winter and to the chalk or limestone soils in summer. They have become the foundation on which light land and fairly dry land husbandry is built; their numbers are not limited by the carrying capacity of the natural grass, which would be low; special crops are grown—swedes, turnips, rape, kale, clover, vetches, etc., on which they are fed, and their trampling and fertilising of the ground so improves it that a succession of corn crops can afterwards be grown. Some grass for summer food is necessary, but this is furnished by the valley lands and the marshes.

The number of sheep per 1,000 acres of cultivated land was, in 1912, no less than 709 in the chalk districts of S. Wilts and N. Hampshire, while it is usually only about 200 or 300, and, indeed, less than 100 in some places. Sheep, indeed, can be regarded as light land cultivators, and their density per 1,000 acres is a very fair index of intensity of cultivation.

The vast difference between the sheep husbandry of the 15th century which displaced human food production, and that of the 19th century, which has intensified it, can be seen in a journey round the South Downs or Cotswolds. Great quantities of human food are now produced, and more could be if this were necessary.

Dairy cows necessitate still further specialisation, embodying the general principle of summer keep on grassland and winter keep on the produce of arable land; but the technical details are somewhat complex. There is, however, a distinct tendency for dairy cows to displace other animals on the heavier lands.

A still further change is now appearing in the relationships between geographical conditions and agricultural activities. It began to show itself some years before the war, and is now becoming very marked in places. Instead of allowing himself to be dominated by his environmental conditions as in the old days, or simply conforming more or less to them as until recent years, the present day farmer tends to take full advantage of every little environmental condition that promises to be of service to him. For this purpose it was necessary, of course, to have a discriminating population, demanding a wide range of products; and that now exists. Townspeople are prepared to buy a considerable variety of food stuffs, and to pay for much smaller differences in quality or earliness of produce than might at first be supposed. Thus strawberries in January, 1921, sold in Covent Garden market at a price regarded by simple countrymen as absurdly high —some 40/- per lb., whilst at a later date the price became lower and lower as the season advanced, till in August they sold at only 1½d. per lb. Similar variations occur each year; the result is that places so situated that they can grow early strawberries have an advantage over those growing later crops.

Even the common potato is subject to the same fanciful taste. At the beginning of May, 1921, early potatoes sold in Covent Garden market at 6d. per lb., but as time went on equally good potatoes obtained smaller and smaller prices, till finally the low prices of the main crop potatoes were reached; a similar drop always occurs.

Thus it comes about that farmers able to grow these crops—and others similarly regarded by the townsmen—at an earlier date than the main body of producers, obtain specially high prices.

Now temperature is probably the most important factor determining earliness: so it happens that the differences in temperature between one part of the country and another are beginning to assume an importance they did not previously have. The belt of counties—Essex, Herts, Beds—has a special value for second early potatoes; Lincolnshire, Cheshire and Lancashire for the later crop. In particular, southern slopes sheltered from cold winds, now have a new value, which is enhanced if a large body of water is near. For this makes the temperature equable, and early crop production demands not only positive warmth, but also absence of cold.

Throughout the history of the countryside there has been a certain amount of specialisation in the neighbourhood of centres of civilisation. Kent, always the highroad of continental culture, has grown fruit from very early days,§ and the sandy coastal region of Suffolk has long produced vegetables, which were barged to London. But it is in our own time that the most significant changes have taken place, and as they have not yet received the attention they deserve, I shall deal rather fully with them.

Among the first to discover their advantages in this direction were the Cornishmen, and for many years the district between Ludgven and Gulval, just at the back of Penzance, has sent early potatoes to London, and obtained better prices than any other part of England. More recently, the banks of the Tamar and its tributaries have been utilised for strawberry growing. At the back of Southampton there is another area now largely used for this purpose, and likely to be still further developed.

Most of the estuaries afford illustrations on the larger or smaller scale. Early potatoes are grown to advantage in the Island of Hoo, in the Thames estuary. One of the most interesting cases is the Firth of Forth; on its southern side there is a stretch of red brown sand running from Portobello to Girvan, on which, during the last 30 years, an important potato industry has sprung up. At first sight it does not look very promising, as it faces north, but experience has shown that during the time the crop is on the ground the conditions are entirely favourable, so that excellent results are secured.

A remarkable case of specialisation is seen round the Wash. Formerly much of this land was used for cattle-grazing, and the district of Long Sutton, then a great collecting centre for bullocks, is rich in memories of the old grazing days; but for some 40 years it was found that the local conditions specially favoured the potato crop, and the Dennys, George Thompson, and the Majors developed the industry, which has now assumed very important dimensions, and has itself the germs of further specialisation, there being the home potato that appeals to the housewife because it cooks to a nice mealy consistence, and a rather special potato that can be chipped and fried for the northern operative, and made to look attractive without taking up too much of the salesman's frying fat. At present 30 per cent. of the cultivated land in the Holland division of Lincolnshire is devoted to the potato crop alone.

The Vale of Evesham, through which flows the Avon affords other illustrations. As the traveller approaches this district from the east, he drops down the Oolite escarpment, at, say Broadway, and comes on to a low-lying clay vale which soon merges into the lighter gravelly soils of Pershore and Evesham districts, famous for fruit, vegetables and such special luxury crops as spring onions, asparagus, etc. Instances abound of "lucky banks" where early produce almost always arrives, owing to the absence of low temperature to which other parts are liable. Another instance of a happy combination of local conditions allowing the development of an important specialised industry, is seen in the patch of country round Sandy and Biggleswade in Bedfordshire, a patch of Lower Greensand traversed by the Great Northern main line, on which an important vegetable industry has developed, Spanish and other onions being important crops.

A district which is rapidly changing in appearance is Wisbech, where the old husbandry is being displaced by a fruit industry that succeeds because it accords so completely with the local conditions, and because also good transport is available. In these cases the temperature conditions are obviously suitable, as can be seen from the map showing the isotherms. Dotted about the country are other but more restricted specialised regions where for some local reason the conditions allow certain fruit crops to flourish. Lyth in Westmorland has a reputation for its damsons, while instances further north are afforded by the strawberry district of S.W. Scotland, and the famous raspberry growing industry round Blairgowrie in Perthshire.

Specialisation is not confined to fruit and potatoes; it is even pushing its way into other branches of husbandry. Barleys for the different kinds of malting, pigs of the different types to produce the various sorts of bacon demanded by different sections of society, cheeses of the different kinds required respectively by Mayfair and the Provinces, are all being produced by the pioneers, and the movement must spread.

This specialisation is going on rapidly, but so quietly that many people miss it. Country teachers have a magnificent opportunity of studying it by making periodical surveys of their districts in conjunction with their scholars, and so observing which of the new attempts spread and which do not. A pioneer tries and succeeds, and others follow; or he fails and others keep off. But there is a strict scientific basis and in the main it lies in some peculiarity of altitude, aspect or soil, which is bound up with the various conditions, forming a complex well suited to the particular crop. To take fruit as an example: we know in a general way that the rainfall must not be too high, that the mean temperature must be satisfactory, and that the daily fluctuations should not be too rapid, that the soil should be a loam; and as transport is indissolutely linked with specialisation, that the road or railway connections must be good. But we are by no means certain that these are the only factors involved.

I have tried to trace out the way in which geographical factors have influenced the agricultural activities of mankind, and if time permitted, it would be interesting to study some of the ramifications of the subject; to trace, for instance, the effect of these activities on the character and characteristics of the populations, to see how the villagers have been influenced by the type of their villages,—by the beautiful stone villages of the Oolite range, the magnificent timbered houses on the great red Plain, and the rather dreary wattle or yellow brick cottages of the Lias. All this the teacher can follow up in his own district; he can study the way in which men have developed sports to fit their agricultural systems, which in turn fitted their local conditions; how in the great clay vales, where cattle grow fat of themselves, men's minds are occupied by the long fox-hunting season, which completely suits the local conditions; how in the drier conditions men became shepherds; while in the eastern counties the great arable stretches required protection from birds, and so the farmer and country gentleman had to be able to kill the rook and the wily pigeon, or they would have had no crops,—thus they took naturally to pheasant and partridge shooting.

Finally we are led to an interesting and hopeful conclusion. We have seen how, for long, environmental factors dominated man and governed his activities, so that he had to live not where he would but where he could grow crops; how he had to eat not what he liked but what he could produce; and how in consequence the face of the country was profoundly affected by the concentration of wealth, power and intellect in certain regions and their avoidance of others. We saw how, during the last century, a great change followed the introduction of transport which allowed of agricultural specialisation, and how men conformed to the local conditions and in the main grew those crops suited thereto. Man was no longer dominated by these conditions, but so to speak ran alongside of them. And lastly, in our day, we see how man is beginning to master these local conditions and turn them to his advantage; how small differences, such as a sheltered slope or the proximity of a bulk of water, may be made to minister to some human need, to produce something which is more desired than other things would be. Historians, I gather, are coming to the conclusion that man is master of his destiny; geographers can safely say that he is rapidly becoming master of his environment.

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* This is well shown in Piers Plowman in the passage where poor honest Piers begins: "Ich have no peny polettes for to bigge," and goes on to specify his hard fare, including "bred for my barnes, of benes and of peses," and then contrasts his condition with that of the luxurious beggars:—

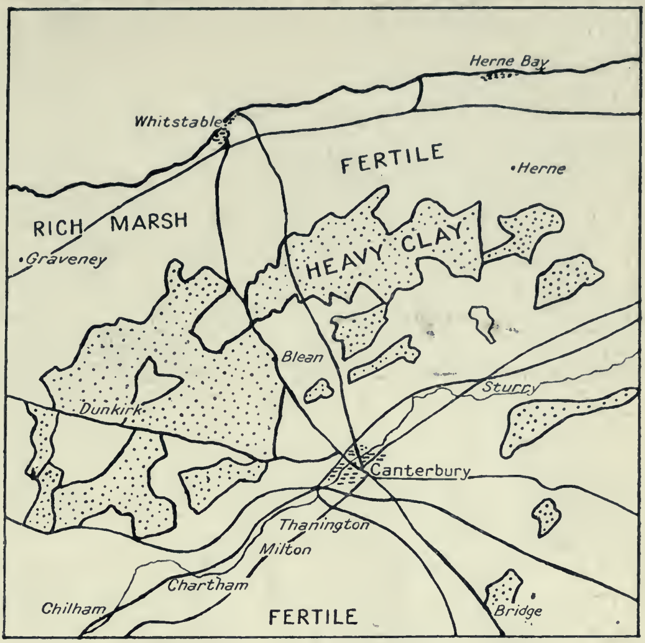
"Noþer beggere eete bred · þat benes were ynne,
Bote clerematyn and Coket · and of clene whete;
Thei wolde non halpeny ale · in non wyse drynke,
Bote of þe best, etc., etc."

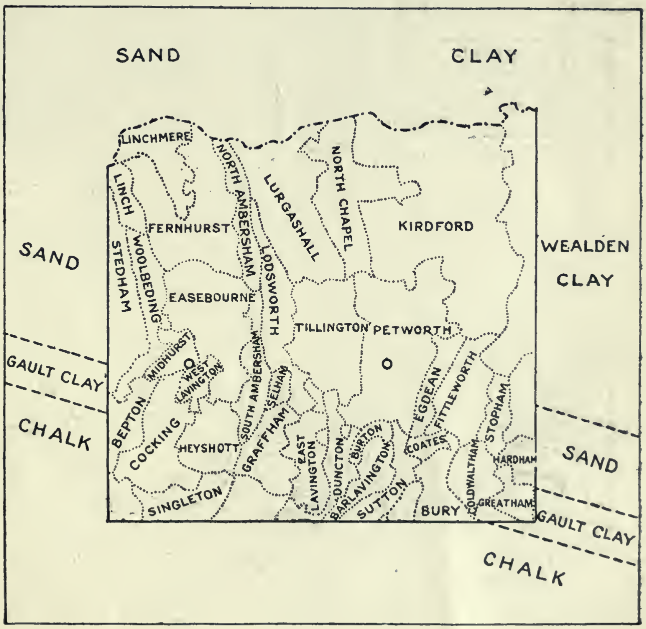
Text C, Passus IX, ll.303 et seq., 327.

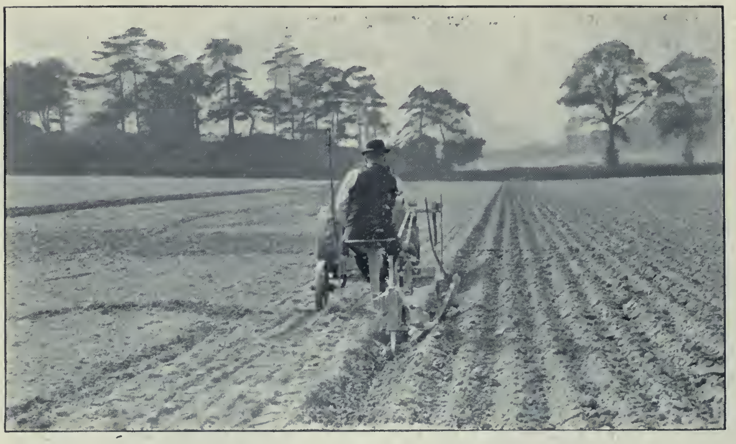
† This monastery was originally founded high up in Wensleydale, but the monks found the district highly unsuitable, because in the cold, wet climate their corn would not ripen. They would have returned to their old foundation, but they feared the jeers of their comrades. Before long, however, they were ordered to abandon the first site, and came to the present delightful spot.—(Dugdale, Monasticon V. 568).

§ Camden (Brittania, 1586) thus speaks of the fruit area of Kent: "Pomis ad miraculum abundans, nec non cerásis, quae anno a Roma condita 680 in Italiam e Ponto deuecta, et vicessimo supra centessimum post anno in Britanniam translata, foelicissime hic proueniumt, multumque agri occupant, arboribus in quincuncem, iucundissimo spectaculo directis."

MAP SHOWING WOODLAND & GOOD AGRICULTURAL SOIL.





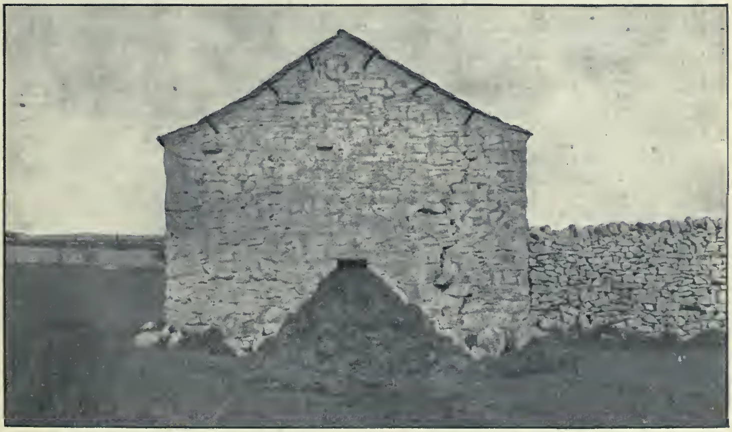


DIGGING AND SUBSOILING PLOUGH.

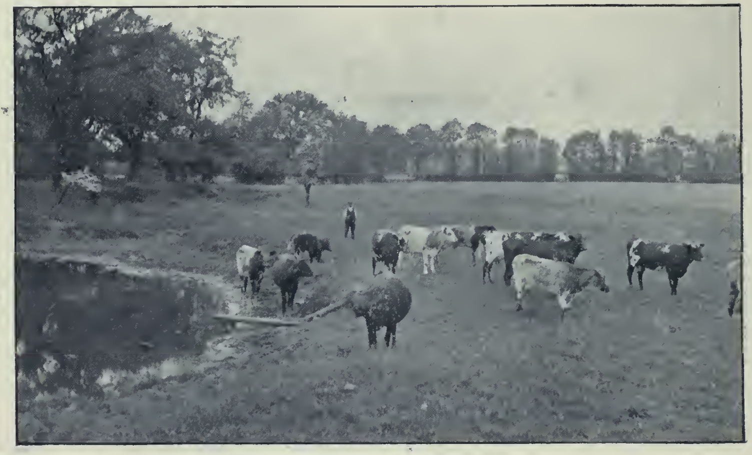
NEAR STRATFORD-ON-AVON.
Copyright by P. Simms, Chipping Norton.

OFF TO THE MILL—OLD STYLE.
Copyright by P. Simms, Chipping Norton.

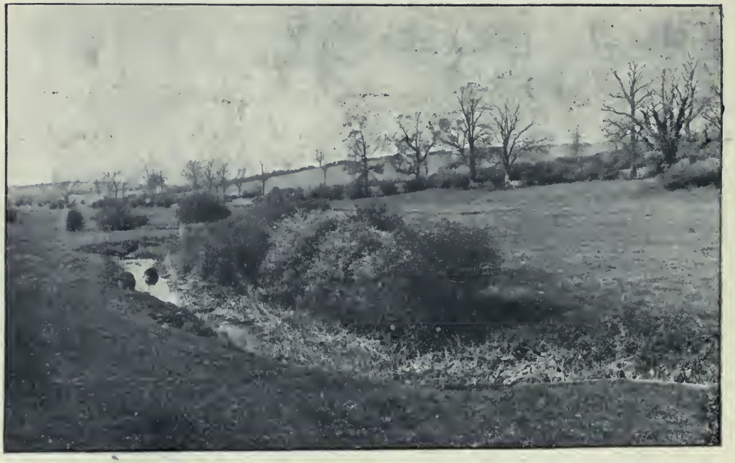
OLD WAY OF MAKING MANURE.



WORST WAY OF STORING MANURE.



SOILING EXPERIMENT.



CLAY COUNTRY IN THE MIDLANDS (NORTHANTS).
Used for cattle grazing. The prevailing sport is foxhunting.

THE NATURAL REGIONS OF SPAIN.

(*Continued*).

An abstract specially prepared from
"Regiones Naturales de España" by *J. Dantín Cereceda.*
[2 vols. Madrid, 1922].

The first section of this abstract was published in this Magazine for Autumn, 1922. It discussed the general facts about Spain, its division into more pluviose and more arid regions, and the characteristics and subdivisions of the pluviose regions.

This second section discusses the characteristics of some of the more arid regions.

THE MAJOR NATURAL REGIONS OF ARID SPAIN.

V. The Castilian Region.

From the N. slope of the Central Dividing System to the S. slope of the Cantabrian Mts., and from the Iberic system to the archæan and primary series of Galicia and Lusitania.

Geographical Structure. Erosion-valleys and paramos modelled in the Oligocene and Miocene which cover the Meseta (Tortonian-Pontian); the theory of the great miocene lakes abandoned since Penck's Studien (1894) in spite of the presence in the Pontian limestones of fresh-water molluscs, which may possibly indicate a closing lacustrine régime.

Quaternary erosion-products from the mountains cover the South of Old Castile and the North of the Leonese plains.

The Douro is the central line of drainage, with affluents running N.W. (L.) and S.W. (R.); it is probably a consequent river running in a recent bed, not imposed.

Note the waterfalls (*arribes*) on the line of contact with the monoclinal fold of the Galician and Lusitanian regions.

The plains are arid and the climate extreme. Fogs are frequent in winter.

Vegetation. Pine-groves, chiefly composed of stone-pine (*P. Pinea;* in Coca, Valladolid, middle Douro), and *P. Pinaster* (Cuéllar, etc.) Some woods of evergreen-oak and of oak (*Quercus ilex, Q. ballota, Q. Tozza, Q. lusitanica* or muricated oak).

The scrub of the high portions of the region is made up of *Spirœa Rhodoclada,* associated with *Lavandula pedunculata* and *Arbutus Uva-ursi.*

Traditional Regions in the Castilian Region.

El Páramo, 903 Km², 2 persons per Km², between R. Orbigo and R. Esla. Climate extreme.

Lagunadalga, 105 Km², 33 persons per Km². Small district on Páramo of Leon.

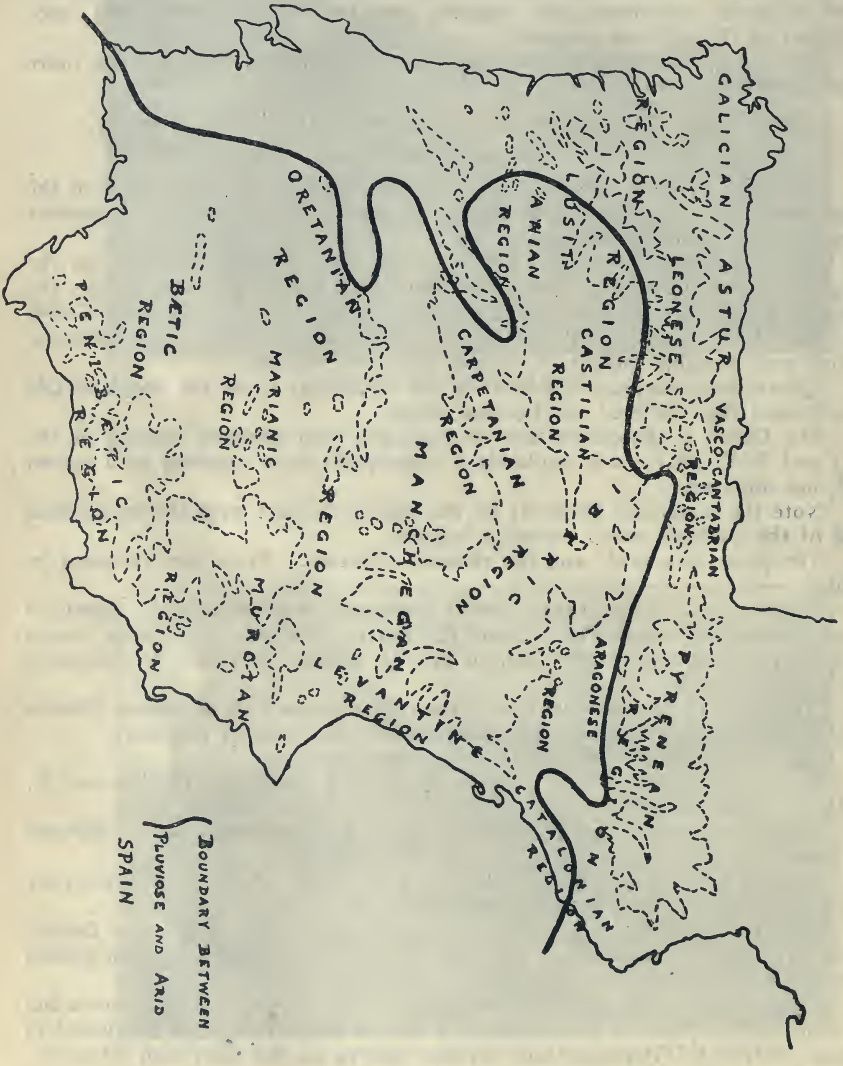
Valle de Valdavia, 1057 Km², 4 persons per Km². Palencia. Quaternary high valley on S. side of Cantabrian Mountains.

Valle de Buedo, 528 Km², 10 persons per Km². Upper and middle Buedo. Rye, vegetables; pastures near the river. Formerly special irrigation system for the flax.

La Bureba, 974.25 Km², 21 persons per Km². Coincides with *merindad* of same name (sphere of jurisdiction of a *merino* or special judge appointed to sheep districts). Paramos and erosion-valleys in the Castilian Miocene. Climate severe.

Tierra de Campos, 3386 Km², 25 persons per Km². Bare, slightly rolling desolate plain, corresponding to La Mancha on the southern sub-meseta. Includes parts of León, Zamora, and Valladolid. Vindobonian clays (used as adobe in building), blue marl, limestone. Cereals (chiefly wheat); sheep. Short spring pastures following harsh winters.

Valles de Cerrato, 1037.25 Km², 13 persons per Km². Between Pisuerga and Esgueva, in heart of Castilian Neogene. Tabular architecture, Vindobonian paramos, clay in erosion-valleys. Water-bearing strata at 840m. Villages at 760m. on valley sides. Arid, desolate country, covered with scrub and holm-oak.



A Map of Spain, 1 :7,500,000 or 1 inch—113⅓ miles.

[The broken lines indicate the 3,000 foot contour. The map is intended merely to give the approximate situation of the major regions, and will be replaced in a later number. Meanwhile the Murcian Region should be deleted and the Levantine Region extended southward to beyond the mouth of the Legura. The Lusitanian Region should also be extended southward to meet the Oretanian].

Tierra del Pan, 678.4 Km^2, 30 persons per Km^2. Between Villalpando and Zamora. Mainly on clays of Continental Neogene, partly on diluvial. Cereals, especially wheat.

Tierra del Vino, 650 Km^2, 49 persons per Km^2. Left bank of Douro, S.E. of Zamora. Mainly diluvial. District, par excellence, of vine and fruits (both Central European and Mediterranean).

La Armuña, 641,25 Km^2, 25 persons per Km^2. North of Salamanca. Vindobonian level of Continental Neogene. Mediterranean Red Earths and ancient Black Earths now in process of degeneration. Wheat and leguminous plants. Traditional communal ownership in *quiñones*.

Tierra de Arévalo, 978.75 Km^2, 23 persons per Km^2. Extensive plain on sandy Diluvial, with remnants of pine forests. Communal organization for pastures and forest. Community divided into *sexmos*.

La Moraña, 985.5 Km^2, 15 persons per Km^2. Plain on the Castilian Diluvial cut by apper and middle courses of Rivers Arevalillo, Zarpardiel and Trabancos, all of wadi-régime.

La Ribera, not precisely defined. Between R. Orbigo and R. Luna. Transitional between Cantabrian Mts. and arid Castile. Cool vega pastures, flax fields, grain and vegetables.

Vega de Toral, not precisely defined. Right of the R. Esla, on Leonese Diluvial. Cultivation and pastures in well-watered valley. Size and importance of human settlements in marked contrast with those of neighbouring Leonese paramo.

VI. The Carpetanian Region.

Essentially the Central Sierras running from the N.E. edge of Meseta in a south-westerly direction to the tectonic valley of the Alagón, dividing the Meseta into two sub-mesetas of different levels[1]. Composed of archæan and primary rocks and extensive granitic intrusions.

The sequence of Sierras, beginning in the N.E., is as follows :—Alto Rey and Pico Ocejón 2,065 m. (Silurian); Somosierra (strato-crystalline); Montes Carpetanos, culminating in Peñalara, 2,405 m.; Sierra de Guadarrama (Siete Picos, 2,203 m.); Sierra de Malagón, 1,560 m., joined to the high *paramera* of Avila (Cerro Zapatero, 2,105 m.), La Serrota (El Santo, 2,294 m.) and Sierra de Avila (Gorría 1,383 m.). To the south rises the Sierra de Gredos where the highest peaks are found (Plaza del Moro Almanzor, 2,661 m.). From the pass of Tornavacas, at the western extremity of Sierra de Gredos, run two parallel chains, enclosing the valley of the Jerte, and a third, the Sierra de Béjar, at the western end of which is the depression, perhaps a line of fracture, in which runs the Alagón.

The origin of the system of sierras is variously explained; it seems probable that an initial folding (pre-Cambrian or Caledonian) gives the system its main character, and that this was followed by granitic intrusions of Hercynian date causing intense metamorphism in the Cambrian and Silurian strata, and by dislocations of Tertiary date.

The *Navas* of the region originate,, especially in the gneiss and granite, where level platforms at altitudes of 800 to 1,000 m. on either side of the summits are cut into by deeply-intrenched streams. The flats (*navas*) of these streams, covered with shallow alluvium forming cultivable lands, give names to numerous villages. High mesetas, granitic or archæan or even cretaceous, rest against the main axis of the system, forming cold paramos.

As in all mountain countries, the upper valleys of the rivers constitute districts. Elsewhere, on the flats and *navas*, old communities of pasture and wood.

VEGETATION. Apart from the Alpine vegetation of the heights, markedly Mediterranean in character. Pine (*Pinus sylvestris*, up to 2,000 m.; *P. Laricio* and *P. Pinaster*). Oak (*Quercus sessiliflora, Q. Tozza*, in shaded sites, and *Q. lusitanica,* in sunny sites). Black poplar and ash (*Fraxinus angustifolia*) in woods and on river banks in the lower mountain region.

Scrub very complex, including :—*Leguminosae: Adenocarpus hispanicus* (mountain and sub-alpine, 1,600 to 2,000 m.); *Genista Barnadesii,* sometimes associated with *Cytissus purgans; Genista Carpetana; Cytissus purgans.*

Compositæ: Santolina oblongifolia; Helichryson serotinus Boiss, replacing *H. Stœchas* throughout the region and in arid Spain in general up to 1,500 m.).

Labiatae: rosemary, sweet marjoram, thyme, French lavender (*Lavandula pedunculata*), etc.

TRADITIONAL REGIONS IN THE CARPETANIAN REGION.

Comunidad de Ayllón, 922.5 Km², 12 persons per Km². Poor district on Silurian Slates in extreme E. of region. Community of pastures, timber and firewood, divided into *sexmos* under *seoses.*

Valle del Lozoya, 294.7 Km², 15 persons per Km². Longitudinal fault valley carrying upper course of R. Lozoya. Valley bottom occupied by marine Cenomanian materials. Glacial cirques (*hoyos*), quagmires, and peat and moss bogs abound. Population on the broader alluvia of left bank.

Valle de Amblês, 725,75 Km², 16 persons per Km². Synclinal btween Sierra de Avila and Paramera de Avila; bottom covered and end closed by broad diluvial band. Town of Avila at the outlet belongs to a different region. Deep, bare, austere valley bounded by granite ridges. Rainfall 380 mm.; 157 cloudless days. Wheat, rye (straw-hats); chickpea; fruit trees; potatoes. Some irrigation. On slopes and tops of hills silvo-pastoral economy.

Valdecorreja, 510.75 Km², 28 persons per Km². On diluvial deposits (750 m.—1,000 m.) surrounded by Sierras de Villafranca, Bonilla and Piedrahita. Soil cool and loose. Simple local irrigation system. Silvo-pastoral economy on heights.

La Vera de Plasencia, 868.5 Km², 32 persons per Km². Right bank of R. Tiétar to Sierra del Piornal. Sunny region sheltered by high mountain wall. Chestnut meets here Mediterranean fruits and even the orange. Former cultivation of flax and silk. House, with sun gallery, very different from that of neighbouring high valleys of Tormes and Alberche.

Valle de Plasencia, 443.25 Km², 25 persons per Km². To W. of the Vera, between Tras la Sierra and Sierra del Guijo, Sierra de Tormantos. Granite country: upper and middle Jerte.

Comunidad y Tierra de Segovia. Community of pastures and forest (firewood) in the Guadarrama and on Castilian and Manchegan diluvial on either side. Up to 1837 possessed extensive pine and oak forests for timber, charcoal, pannage, etc. By the statutes of that year the community ceased to exist in law, and subsists in fact only to a limited extent.

Guadarrama, 4,228 Km², 21 persons per Km². Mountain system of which the main ridge, 200 Km. in length, culminates in Peñalara (2,406 m.). The system rises from a granite base, largely converted by erosion into a level platform. Two longitudinal valleys only, carrying R. Lozoya and R. Moros respectively. Pine forests and Mediterranean scrub. Alpine character of vegetation accentuated from 1,700 m.

Comunidad y Tierra de Avila, 19/20 per Km². An administrative unit of which the mountainous part alone belongs to this natural region. In the Sierra the *navas* are the typical forms, slight concavities among the rounded granite hills. Thin soils of felspathic and quartzose sands, of grey colour tinted with rose. Essentially a pastoral area: low pastures (1,200 to 1,300 m.) till June, higher summer pastures June to October. Some cultivation—rye, potatoes, carob, chickpeas. Patches of pines (exploited for resin, fruit and firewood). Enormous areas of scrub (woody *Labiatae, Adenocarpus, Avena, Stipa, Genista and Jara*).

VII. Manchegan Region.

The Manchegan Region corresponds on the south side of the Central Dividing System to the Castilian region on the north.

Immense neogene deposits, the waters being found at the level of the Tortonian clays.

Vast plains worn by erosion either into small mesetas and erosion valleys (La Alcarria) or into smooth surfaces from which the strata from Pontian to Sarmatian have been entirely removed, leaving the Tortonian clays, broken only by small hills evidencing extinct geyser action (La Sagra, La Mancha, etc.)

In the N.W. a broad quaternary belt covers the Neogene from Cogolludo to the La Jara district (N.E.—S.W.). The junction line of this belt with the Miocene is given by the Henares, Madrid, Esquivias, Toledo, La Jara.

The elevation in mass (accentuated in the N.E.) of the Meseta determines the general south-westerly slope and the direction of the rivers (Henares, Tagus, Záncara, etc.); the erosion-forms are youthful and sharp, the river beds winding and deeply intrenched, not in harmony with their present surroundings.

The quaternary belt has two main slopes: one from N.E. to S.W. in the direction of the general slope of the Meseta (2.22 per 1,000), the other, N.W. to S.E., much steeper (4.22 per 1,000).

Three zones of the Quaternary are distinguishable :—

(a) of large boulders, near the sierra;
(b) of sands, middle region, the most extensive;
(c) of finer elements, on south-east border.

These are referred to the torrents of the glacial period, which covered with their immense deposits the Vindobonian Meseta. The streams of the present arid régime are still working on these deposits, modelling the gully (*cárcava*), the typical erosion form.

The Tagus is the common base level of this district. Note the direction of the tributaries (Jarama, Manzanares, Guadarrama, etc.), and the peculiar dyssymetry of the valleys, scarped on west and north-west.

The remainder of the region, including the plains of New Castile and Albacete, is made up of the Neogene, with small patches of Silurian (Madridejos, Lillo) and the Trias of the Montiel district.

The lagoons and saline grounds, numerous in the west-central part of La Mancha, are evidence of the difficult drainage of a region with undefined river channels; the waters leave in slight depressions the salts, sulphates and nitrates, washed from the constituent Neogene (Lagoons of Ontígola, Tembleque, Madridejos, Turleque, Quero, El Toboso, Alcázar de San Juan, Pedro Muñoz, Socuéllamos, Daimiel, etc).

In the S.E. of the region, the upper Júcar, draining to the Mediterranean, alongside the Záncara and Cigüela (Atlantic drainage), seems explicable only on the hypothesis of capture.

Climate extreme, with absolute drought in summer. In contrast with the N. sub-meseta, the summer is the more extreme season. Means over 20 deg. from June to September. Clouds, typical of the Castilian winter, here absent. Mean of cloudless days, 154. The mean of the maxima varies from 33 deg. (Albacete), 34 deg. (Madrid), to 36 deg. (Ciudad Real, transition to the Oretanian region).

In winter, temperatures are not extreme (altitude apart). Mean below 5 deg. in Madirid and Albacete (N. and S. border of the steppe), with two very cold months, (December, January), and temperatures below 0 deg. as late as May. High mean annual range—36 deg. (Ciudad Real), 34 deg. (Madrid), 33 deg. (Albacete).

Diurnal range: Winter, 8 deg. (Albacete), 9 deg. (Madrid). Summer, 15 deg. (Albacete), 18 deg. (Madrid). The winter temperatures and the mean annual temperature (14 deg. to 18 deg.) bring the region within Köppen's Warm Temperate Zone.

Rainfall spread over 82 days; general mean 415.5 mm. (Madrid, 422; Cuidad Real, 460; Albacete, 375). Spring maximum (May) higher than Autumn maximum (October).

VEGETATION. Trees confined mainly to the diluvial belt of New Castile and the paramos of Aalcarria. Essentially composed of holm-oak (*Quercus Ilex, Q. Ballotax*, with a sprinkling of *Q. lusitanica* and cork-oak. A few isolated clumps of pines, chiefiy *P. Pinea,* are the residue of larger woods. Intermediate between forest and scrub is the scarlet oak, *Q. coccifera.*

The scrub and steppe predominate over the region. The scrub is essentially composed of :— Woody *Labiatae* : rosemary, lavender (*Lavandula latifolia*), sages (e.g., *Salvia lavandulœfolia*), sweet marjoram, thymes (*Th. hirtus, Th. Zygis,* L). *Leguminosae* : brooms, furze, *Coronilla*, *Dorycinium, Sarothamnus eriocarpus.* With these are associated *Melichryson Stœchas* (and in the steppe *H.S. cœspitosum*), flax-leaved Daphne (*R. Gnidium*) and the cistus, the last not so amply developed here as in the Oretanian and Marianic regions. These acquire a common physiognomy due to the climate, and become fused into the *matorral,* which, rather than the olive, is, as V. de la Blache pointed out, the characteristic feature of Mediterranean vegetation.

The Steppe is the typical feature of the region. Commonly the saline steppe, characterized by the presence of halophyles, is set within the esparto or grassy steppe, with transition from the latter to the surrounding scrub. The absence of trees except for an occasional clump of stone-pine, the glaucous or whitish tones of the vegetation consisting of plants thorny (*Ononis tridentata,* L), hairy or oily, give to the landscape an aspect of singular desolation. In the grassy steppe, esparto and *Stipa* are characteristic. Hundreds of villages live by the esparto industry.

In the saline steppe the *barrileras* are typical. Red saltwort (*Kochia sanguinea,* Wk.) peculiar to extreme steppe districts (Castillejo, Ciempozuelos). *Atriplex littoralis, Caroxylon tamariscifolium, Halogeton sativus, Salsola vermiculata,* var. *flavescens,* etc., very abundant. *Centaurea hyssopifolia* and *Tamarix gallica,* L., the latter on the marginal salt-marshes of the Tagus and Jarama.

TRADITIONAL REGIONS IN THE MANCHEGAN REGION.

La Alcarria, 4,309 Km², 15 persons per Km². Described in detail.

La Campiña, 1,363.5 Km², 20 persons per Km². Flat country from right bank of Henares (*Campiña baja*) to cretaceous foreground of sierra (*C. alta*). Vegetation Mediterranean with ash and Lombardy poplar in valley bottoms. Spring and Autumn pastures; former community of pasture-lands.

La Sagra, 723 Km², 32 persons per Km². Right bank of Tagus near Toledo. Flat region on Tortonian clays. Rainfall 300 mm. Largely steppe and saline steppe. Cereals. "El Greco" landscapes.

La Mancha, 28,299 Km², 21 persons per Km². The flat ground *par excellence* of the Meseta. Upper la Mancha in paramos (*Meso de Ocaña*). Lower La Mancha an ocean of plain on Tortonian clays, with interminable ploughed lands. Wide expanses of saline steppe and scrub. Drainage difficult on the plain, hence saline pools (Quero, Quintanar). Wadi régime of the brooks; deep trenches with orchards on the flats (Cigüela, Riansares). Olive, vine, cereals, saffron, sumach, various aromatic seeds. Sheep and mules the only stock.

Campo de Montiel, 2,799 Km², 21 persons per Km². Region of *latifundia* with large, widely separated villages.

LA ALCARRIA.

One of the most sharply defined natural divisions of the Manchegan Region is La Alcarria, with clearly marked boundaries on north, east and west, and fading insensibly on the south, by the sullen plains of Huete and Prieto, into the plain of La Mancha.

On the west it is bounded by the degraded quaternary terraces of the left bank of the Henares, which form lofty cornices mirrored in the waters of the river; these were the favourite sites of primitive man in the stone ages and, thousands of years later, the scene of the Castilian epics: in the "Cantar del Mio Cid" Albar Yáñez Minaya scours them with his foraying bands as far as Alcalá.

On the north the boundary is marked by the high Triassic mesetas (1,200 m.) of Sigüenza and Molina de Aragón, with their deeply-ravined flanks, and on the east by the high mesozoic plains aligned along the north-eastern edge of the Meseta, marking the inner face of the Iberic System.

The pretty little town of Brihuega may be taken as the centre of this traditional region rather than the capital, Guadalajara, which lies on the western margin, some kilometres distant from the scarp in which the Alcarrian paramos begin.

La Alcarria is, par excellence, a land of paramos on mesetas. Here the slow accumulations of the fresh-water formation of the second half of the Tertiary prevail, the strata preserving unbroken their original horizontality; persistent erosion has cut deeply into the thick mass of these strata, carving out the narrow valleys which form the natural lines of communication for the inhabitants.

The *modêlé* of the district offers us therefore two forms of relief only—the paramo (*alcarria*) and the erosion-valley. The paramos or *alcarrias* are high mesetas, truncated pyramids resembling a kneading-trough overturned, presenting their slopes to the erosive process. The Cid crossed them on his way to Alcocer.

> "Up Henares they ride, fast as the horses can bear them,
> Over the alcarrias, ..."

In the valley-bottoms erosion has now reached the level of the Tortonian clays; the scantily-fed water-courses flow within the contours of 650-700 m.

Ascending from the thalwegs of the valleys to the flat sheets of Pontian limestone which crown the paramos, we may pass in review the successive geological horizons of the fresh-water Tertiary.

First appear the thick grey-red clays; then comes the level of the blue Sarmatian marls, the dried-up bottoms of ancient lakes, dregs of saline pools similar to the present-day shotts of Algeria; a small, but interesting, lignite bed follows, overlaid by whitish marls; finally the slope of the hill-side, hitherto gradual, is broken abruptly by the thick Pontian limestones, with casts and fossil shells of fresh-water molluscs (*Helix, Planorbis, Bithinia, Limnœa,* etc).

A sufficiency of fossils has been found to enable the different strata of the paramos to be dated with confidence: the fossil mammalian fauna of Vindobonian age found at Jadraque has long been known; we ourselves found a *Melanopsis* in the lignite bed, enabling the Sarmatian date of the bed to be affirmed with certainty; various geologists have found lacustrine molluscs of Pontian date in the upper limestones.

The summit reached (at an altitude of 980 to 1,000 m.), there stretches before us the unbroken surface of the paramo, immense, desolate, austere.

The atmosphere is of limpid and crystalline transparence; the paramo cuts the line of the azure sky in a clear raw line. Teresa de Cepeda, crossing Peñalver on her way to found Pastrana bore away the impression of its solitude, its endless silences.

The whole country is gently inclined towards the south-west from Mandayona, in the north-east corner, to the Mesa de Ocaña (Toledo).

The two principal rivers, Tagus and Tajuña, run, deeply entrenched, in the direction indicated, dividing the country into massifs taking the form of mesetas.

The climate is continental Mediterranean. The extremes of temperature are 0.4 deg. (mean minimum in January) and 29.78 deg. (mean maximum in August.)

The annual range is about 29 deg., in a few places 36 deg. C.

The rainfall figures show La Alcarria to be one of the most arid districts in Europe. The mean annual rainfall of 405 mm., and the distribution of the rain throughout the year confirm the Mediterranean character of the climate. The principal maximum is in October, 65 mm., with two secondary maxima in December, 44 mm., and May, 40 mm. The minimum is in summer; July 9 mm.; August, 8 mm. In a word the equinoxes are rainy seasons; so is the winter, in contrast with the extreme summer drought, which begins in the latter half of June and continues until the latter half of September.

The ratio of evaporation to rainfall gives an index of the aridity; the evaporation, 1,569 mm. per annum, is about four times the total precipitation.

Two types of agricultural soils result from the climate—the Mediterranean Red Earths and residual patches of Black Earths, the latter now in process of degradation and rapidly approaching extinction.

The preponderating Red Earths, which give their warm, rosy tones to the distant landscapes, are the direct consequence of the present climatic régime. The Black Earths are a survival of an earlier wetter régime.

The vegetation is also, of course, essentially Mediterranean. Three formations divide the area—the Wood (*monte alto*), the Scrub (*monte bajo*), and the Steppe; the Scrub markedly predominates over the other two.

The rather scanty groups of trees are of two kinds only—the grove of holm-oaks, of a dark, sober green, in close association with the Steppe on the flat arid surfaces of some of the paramos, and the clumps of elm and black poplar marking with green the line of the brooks in the valley bottoms. Tall, stately walnut-trees stand solitary in the valley; solitary too in the centre of each little *plaza* stands the village elm, the silent witness of Time's changes.

The Scrub is the domain of the scarlet-oak, *Q. coccifera,* stunted and flattened towards the soil, on the marl and limestone levels, and, above all, of the woody plants, greyish and evergreen. The association is made up of thymes (*Th. hirtus, Th. Zygis*), lavender (*Lavandula latifolia*), sages (*S. officinalis, S. hispanica*), rosemary, etc., in large clumps, and some leguminous plants, broom and furze, among which *Genista Scorpius* dominates.

The esparto of the Steppe surrounds this formation like an aureole or even finds its way inside.

The cultures also are essentially Mediterranean—cereals, vine, olive. The olive grove (*gordal,* the fleshy olive, and *manzanilla,* the medium-sized olive) ascends the slopes to the level of the limestone; here and there it reaches the summit and spreads out over the paramo.

The water absorbed by the porous limestone of the heights comes to the surface again along the line of contact between the limestone and the underlying impermeable clays. The water-bearing level thus defined, being the only such level in the district, determines the site of the settlements and the distribution of the population. The little villages, set halfway up the valley-sides, are adjusted in site to this level, below it but not far from it, at an altitude of 720 m., approximately

Three principal motives govern the siting of the villages : the climate, which obliges man to take shelter from the wind and raw cold of the upper valley; the water-level, with its line of springs; the easy cultivation of the *vegas* and *navas*.

Human occupations are in close dependence on the environment.

Earthy materials are exploited in lime-kilns, gypsum-pits, alabaster quarries. There are flour mills, olive-presses, wine-presses, and rows of bee-hives wherever the aromatic scrub flowers; above, on the steppe, there is the humble esparto industry. On the high plain, too, along the sheep-walks, among the yellow, withering stubble, one sees flocks of sheep, their grey fleeces matching the tones of the landscape. R.A.

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[1] Botella calculated the levels of the different plains, as existing before the beginning of the present cycle of erosion, to be as follows:—.

Douro Valley, N. sub meseta, 800 m.—900 m.
Tagus and Guadiana Valley, S. sub-meseta, 700 m.—800 m.
Guadalquivir Valley, 400 m.
Western Plains, 300 m.
Segura Valley, 50 m.—100 m.

A Graded Course in Geography. By E. S. Price. pp. 64. 9¾in. x 7¼in. Philip.

The present volume, Book II, seems to be even better than Book I, which was very favourably reviewed in these columns in Autumn, 1921. The regions under discussion are Australia, New Zealand, and Africa, and we feel that secondary school pupils using this book on the lines laid down would, at the end of their second year, have an extensive foundation on which to build later work, and would have nothing to unlearn. Every page is obviously the result of careful experiment by an enthusiastic teacher, and the numerous suggestions regarding correlation deserve every consideration. In addition to the regional work there are useful chapters on further map work, elementary and necessary mathematics of the sphere, and items dealing with rock structure, rock weathering, and human activities. The diagrams and maps, as before, are original, stimulating, and contain much carefully chosen material. Book III—North America and British Isles, is promised shortly.

The Teaching of Geography in France. By E. M. Butterworth. pp. 137. 4½in. x 7in. Price, 2/6. Blackie.

This book well deserves a place in Blackie's excellent Pedagogic Library, and should prove valuable to anyone interested in general educational topics. Teachers of geography desirous of becoming familiar with another nation's solution of the particular problems will appreciate the wealth of accurate detail which the book contains. Miss Butterworth was well equipped for her particular task, and the facilities granted her in 1920-21, as Gilchrist geography student, have been used to good purpose. Keen observation and a sympathetic appreciation of the other person's point of view characterize the pages. The book lends itself so admirably to extracts that the difficulty is to decide on a choice, and as the price is so low, probably the best praise is to advise teachers to make an early purchase of the work. The teaching of the subject in elementary schools, secondary schools, training colleges, and university colleges is analysed, and there is much of interest regarding the curriculum, plan of teaching, and apparatus employed. The merits and the failings of the French system will offer useful points for stock-taking by conscientious British teachers. The French scheme is excellent in many respects—for French people—and a careful perusal of the pages will help to illustrate much more than the writer's immediate enquiry. The French tendency to centralisation is excellently described, and it is evident that the quick-natured, impulsive, but nevertheless, logical, Frenchman, has evolved a system of teaching geography which is probably much more valuable for France than the British modern methods would be. It seems equally true that the French methods would be unsuitable in Britain, but the suggestion of greatest value which seems to be made is that our own methods are probably more in need of some revision for our own needs than the French system is for their special requirements. A few misprints, as those on pp. 4, 93, 125, should be corrected when a second edition is issued. W.E.W.

CAPETOWN IN A MENTAL FOG

By E. J. G. Bradford.

EVERY schoolboy and schoolgirl of secondary school age has heard of Capetown, and quite a number know something about the place. Twenty years ago when South Africa was the focus of political interest in this country, the name may have been more familiar to the scholars. In those days modern methods in teaching geography had hardly begun to influence the schools generally, hence we may assume that the pupils of that period knew very little about the town beyond its position on the coast of Africa. Does the scholar of to-day know any more?

In most elementary and secondary schools the complete geography course covers the whole world. One of the guiding ideas of the geography teacher in planning a syllabus should be to provide a course which shall enable the pupil to develop a view of the world in something like true perspective. A true perspective implies that each portion of geographical information which the pupil acquires shall be realised as having a special world relationship—a special world setting.

How does Capetown appear in its world setting to pupils who have had a full secondary school course in geography? How far does the teacher succeed in developing an accurate or even adequate perspective in the mind of the pupil?

A series of tests were given in four schools.† Each test question was given both in a boys' school and in a girls' school, but as no significant differences were apparent between the results from the two schools they have been combined in the tables given below. The schools were all similar in character in that they were filled entirely by children who had gained free place scholarships, hence these schools contained a considerable fraction of the best brains of the school population. In that these schools contained more than 50 per cent of the secondary school pupils of the city the results may, with little inaccuracy, be regarded as a fair sample.

As the questions were all of one type and worded in a similar manner only one need be given in full, it was worded as follows :—"Put the following places in order according to the average amount of rain which each has in the year. Place the figure (1) after the place which has most; the figure (2) after the one with the next heaviest rainfall, and so on; the figure (12) will come after that with the least rainfall.

London. Bombay. Bergen. Capetown.
Cairo. Mexico. Singapore. Buenos Aires.
Jamaica S.E. Winnipeg. Tokio. Madrid."

The second test asked pupils to arrange in a similar manner twelve towns according to their population. They varied in size from Paris and Chicago to Kimberley and Suez.

The third test asked pupils to arrange twelve places according to their distance from the town in which the schools were situated. The distances varied from those to Inverness and Berlin at one extreme and those to Cape Horn and Tasmania at the other.

The fourth test asked pupils to arrange twelve places according to the mean temperature in the hottest month. The places given were roughly on a line from Bergen to Capetown; all of them were near the sea coast.

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† I am greatly indebted to the Headmasters and Headmistresses of the schools concerned who willingly afforded the facilities for experiments; and to those members of the local branch of the Geographical Association who are geography specialists in these schools, for assistance in conducting the tests.

The fifth test asked pupils to arrange twelve latitudes according to the mean temperature of the hottest month. Each place was to be considered as being near the sea coast. The latitudes were those of the towns given in the fourth test, varying from 60 N. to 34 S.

In each test the places given were graded from one extreme e.g. hottest or largest, to the opposite extreme e.g. coolest or smallest. The tests were given in June i.e. towards the end of the school year, hence the collected results given below present a picture of knowledge as it was at the end of the first, second, third, and fourth years of study.

I. Number of pupils who assign a particular rank to Capetown in the matter of total annual rainfall.

Rank	1	2	3	4	5	6	7	8	9	10	11	12	Total No.
4th year	4	8	7	6	19	8	5	10	9	5	8	2	91
3rd ,,	6	14	15	13	20	6	10	15	11	5	5	2	125
2nd ,,	8	5	13	15	19	27	21	14	18	5	8	6	160
1st ,,	9	15	13	14	18	18	22	13	13	16	10	2	164

II. Number of pupils who assign a particular rank to Capetown in the matter of population.

Rank	1	2	3	4	5	6	7	8	9	10	11	12	Total No.
4th year	0	0	4	12	13	24	16	6	14	6	3	2	100
3rd ,,	2	3	9	11	16	29	36	17	15	8	3	0	149
2nd ,,	3	8	13	17	30	30	23	20	24	9	2	1	183
1st ,,	0	5	13	16	28	21	33	21	20	9	4	2	172

III. Number of pupils who assign a particular rank to Capetown in the matter of distance from home town.

Rank	1	2	3	4	5	6	7	8	9	10	11	12	Total No.
4th year	0	0	0	3	5	12	28	22	10	12	6	2	100
3rd ,,	0	3	3	6	10	25	29	27	24	17	4	1	149
2nd ,,	2	0	1	5	21	24	33	35	20	18	9	15	183
1st ,,	1	3	6	14	26	26	28	23	16	15	8	6	172

1V. Number of pupils who assign a particular rank to Capetown in regard to mean temperature of hottest month.

Rank	1	2	3	4	5	6	7	8	9	10	11	12	Total No.
4th year	2	3	5	6	18	16	12	13	8	2	3	3	91
3rd ,,	5	7	13	10	11	29	14	16	12	1	3	2	125
2nd ,,	3	5	13	10	16	46	12	26	12	9	4	4	160
1st ,,	17	5	11	14	19	40	13	25	6	7	4	2	164

V. Number of pupils who assign a particular rank to Lat. 34 S. in regard to mean temperature of hottest month.

Rank	1	2	3	4	5	6	7	8	9	10	11	12	Total No.
4th year	1	0	1	1	5	5	70	3	2	0	0	3	91
3rd ,,	1	0	0	6	15	4	88	8	1	0	0	2	125
2nd ,,	1	3	1	3	6	9	123	7	1	1	3	1	160
1st ,,	1	0	1	2	4	12	137	2	4	0	1	0	164

The above tables may be interpreted in the following manner, e.g. the rainfall table (I.) shows that four pupils after four years of instruction in geography in a secondary school, think that Capetown is the wettest town in a list which includes some of the wettest parts of the world. Of the 4th year pupils 25 think that the town is among the wettest in the world (ranks 1 to 4) and should be associated in this connection with such places as Singapore, Bombay, Bergen and Tokio.

The results taken altogether suggest that a very great vagueness pervades the geographical information which is acquired by the schoolboy and schoolgirl. Obviously nothing approaching to a true perspective of the world is achieved by current teaching methods. One may well ask what is the value of a reasoned geography which is based on such vague and inaccurate premises? It would be an interesting exercise for teachers to decide from the above data which should have been the correct rank allotted to the town in each particular test, another exercise would be to decide from these data the year in which the geography of Africa was studied in the schools. A concensus of opinion is almost absent from the results of four out of five tests. Complete knowledge would have resulted in every pupil giving the same rank; complete ignorance would have resulted in an equal number of pupils choosing each rank. It will be noted that the results of test V. approximate to the former and those of test I. to the latter category.

Not only do the pupils who are taught in the same class have very different opinions regarding geographical information which they acquire, but the rather remarkable fact is disclosed that practically no progress is made during the four years of study, that is, the development of perspective does not progress although much new information is acquired. Is the cause of this to be found in the psychology of the pupil, the method of teaching or in the nature of the subject matter included in the school syllabuses?

One cannot expect even a trained geographer to be able to give the distance, temperature or rainfall, etc., of every named locality with which he is familiar, but one might reasonably expect the pupil who has "graduated" from a secondary school to be able to classify well-known places as being for example, wet, medium, dry, or hot, medium, cold, relatively to other areas on the world's surface. To be able to place a town in the correct third of the scale of world values should not be regarded as too fine a degree of precision to be expected of pupils who have been through a secondary school course. If geography teachers aimed at greater precision they would probably succeed—would it not be worth while to endeavour to clear away this mental fog?

There is not room in a short article to deal with all the points raised by the experiment, but it may be of value to consider here one important point. An interesting and significant result is obtained by comparing the two temperature test scores. One list contained the names of twelve places, the other contained the latitudes of those same places. Given the names of places there is no uniformity of allotted rank, but when only the latitude is given a remarkable uniformity is obtained. A latitude has meaning in terms of temperature, the name of a locality conveys very little meaning in terms of temperature! Could a better example be obtained of the futility of teaching geographical principles in vacuo? Surely the teaching of a principle is only justified when it can be applied to concrete instances, and when it thereby assists the pupil to systematise the information which he or she acquires in the course of study.

Mesopotamia (Iraq) in Water Colours. By Edith Cheesman. 16 x 22 cm. A. and C. Black. 1922. 2/6.

This addition to Messrs. Black's water colour series will be most welcome to all teachers of geography whose classes are studying Mesopotamia. There are 16 pictures admirably executed and reproduced, which give very much better than any words could do the difference between towns at home and towns in Iraq. It is perhaps unfortunate, from the geographical point of view, that none of the pictures illustrates irrigation and agriculture, but even allowing for this the book is so useful and so cheap that we recommend all schools to place it on the geography library shelves, and to send to Messrs. Black, 4, 5, 6, Soho Square, W., for the list of volumes uniform with it.

GROUP WORK IN GEOGRAPHY.

AN EXPERIMENT.

By Miss Dorothy Wilford, Lecturer in Geography at Stockwell Training College.

THE work given in the syllabus for the year was the "British Isles in detail," and the class included thirty girls sitting for Matriculation in the next year.

All had received instruction in Geography before, but no girl had made any attempt to conduct her own work. There was consternation for a few minutes when the suggestion was made that the country should be divided into regions and each member should study one. When, however, the next suggestion came along—that friends might work together either as partners, trios, quartettes, etc., the class began to cheer up and a rapid "wireless telegraphy" went on with understanding nods from all parts of the class.

A question then rose—"What about the region we don't study ourselves?" and it was decided that each group should give an account of its findings to the whole class when the group was ready.

Then a puzzled individual asked "Where and how shall we begin?" This was just what was required to bring clearly before the class the geographical order in the study of any region. A brisk discussion followed —there must be maps of course, large ones and well-coloured, so that everyone could see them easily from any part of the room—there must be notes—"Oh yes, and can we bring pictures and specimens and our own books, etc?" By this time the geographical order had been written on the board—

1. Relief : Highlands.
   - Lowlands.
   - Rivers.
2. Weather : Heat.
   - Pressure.
   - Winds.
   - Rain.
3. Products : Mineral.
   - Vegetable.
   - Animal.
4. Man : Work.
   - Division of the Land Communications.
   - Trade.

The Relief map was then found in the Atlas and the different groups set to discuss which Region each wanted to study. This led to much geographical selection. "We should like to 'do' the South West Peninsula, but we don't know where it stops on the east." In the end a list of the different regions was prepared and passed round the form, each group signing against the one its members preferred to study. When two groups "wanted" the same region, they were left to arrange the matter themselves, and it was afterwards found that if one group had more chance of doing the work well, the others gave way.

The need of an "organizing secretary" was felt, so one was voted for and appointed. She began her duties by making a fair copy of the list of the Regions and the groups studying them, leaving a column for the dates when the work would be ready. She was also presented with a special book in which to keep a record of the work. At the end of this she felt not a little important! By this time the first period was over.

The next time the class met the groups were ready to begin the actual work. The room was joyfully re-arranged to accommodate the different groups, drawing paper was cut to the required size and then came the question of how to get the small map on to the large piece of paper. This was explained from the blackboard and soon there were long pauses in the loud buzz of conversation and finally nothing but a few odd questions asked. The work was organised in the group—one or two members making the Relief map, others the Weather, another the Products, another the Population map, and so on. There was no difficulty about this and the work went smoothly as each girl was doing that part of the work appealing to her most.

During this second period the pupils came one after another with difficulties which could not be settled in the group, e.g., the exact limits of the Region, which contours to reproduce on the large map,—"Am I to put in all the rivers?" "Where shall I get to know what crops grow in this region?" etc. This was the most satisfactory part of the whole experiment—the girls really wanted to *know* and the whole class brought whatever might be useful for the work, and a very happy social "atmosphere" was the result.

The preparation of large scale maps, collecting notes, mounting illustrations went on for eight periods, and at last one group hesitatingly promised the organising secretary that its members were ready to give an account of themselves to the whole class. There was great excitement, and the girls of the pioneer group were not as other members of the form! Then the date was duly posted up on the list made at the beginning, and at last the time came round.

The maps had to be printed on the back wall because the black board was a slate one. The whole class was therefore obliged to reverse its position and this was an occasion for much joy as the top of the desk was the only available place for them to sit. The organising secretary sat at the mistress's desk—the mistress sat with the class. The organising secretary opened the meeting by announcing the region to be described (it was South-West England) and by calling on the members of the group to begin. This they did in a delightfully un-selfconscious way. The class took notes, the mistress kept quiet, and the work went with a swing. The class stopped the speaker continually to ask the meaning of words, and to have difficult points explained over and over again until the meaning was clear. The group continued its account until the Relief, Weather, Products and People had been described.

The next stage of the work developed from a question asked by a thoughtful enquirer, "Does the girl who drew the vegetation map know that this (pointing to an area of thin pasture) is Dartmoor?" To make sure that each region should be as far as we could make it a finished piece of work, a set of hektographed maps was prepared and given to each girl.

These were arranged in the note book, and a few notes written under each map in their right geographical order. Great care and much taste were shown in the selection of postcards, views, newspaper cuttings, snapshots, etc., and the arrangement of these improved very much towards the end of the course. Geological specimens were shown during the "lecturette" but passed round while the notes were being written in preparation.

The second page showed Climate, and where the girls were satisfied to take data from the Atlas, they were left to do so, but when one member of the class asked how we knew exactly which was the prevailing wind, the daily weather reports were fetched from the cupboard, and with great patience this pupil made a record of the winds from January to July. Another girl, looking at the rainfall map, asked how any rain could get past the Lake District and the Pennines to the North Yorkshire Moors if the winds are South-Westerly and Westerly. This ultimately led to the question of cyclones, which were studied with much interest and energy. The class then got the reputation for being weather-wise, other Forms coming to know if it would be fine for their games fixtures, sometimes weeks in advance !

The next section was given to Products, and the Population map, and the reasons for its distribution carefully described in the notes. The account of the whole region and the making of the notes took a fortnight The hectographed maps were coloured and notes made in the neat books at home. Not a little of the success of the scheme was due to the creative activity of making these books—all of which were works of art—but some more beautiful than others and the pride in them all inordinate !

When this was done, the organising secretary looked up the group for the next period. At the beginning she read out the minutes of the last meeting and then all proceeded as before.

There was a tendency in some groups to copy long extracts from books. This, however, was not stopped by the mistress, but the matter was left until it came to the 'turn' of that particular group to give their account. These pupils were of the large and comfortable type and inclined to laziness. They began to read their long bookish accounts, the class got restless, tired, bored and at last thoroughly indignant. The "bores" were not allowed to continue, and each girl made her own study of that region herself.

While the speaker was going on the mistress never interfered unless a vitally wrong statement was made. If anything of importance had been omitted this was added at the end of the proceedings.

N.B.—Since the above was written the experiment has been tried with a group of 51 Council School children from eleven to thirteen years of age. Great interest and enthusiasm were shown in the work and great pride taken in the note-books. It was simply wonderful to see the number of illustrations the children found to put in their books and delightful to find how readily these were exchanged or given to others. One girl went to Leith Hill with her father and got a snapshot of the "Weald" from there. This same little girl asked in a very superior way if the mistress had seen the report that morning in the "Times" of the state of the hop-crop in Kent.

The writer will be pleased to send one of these note-books to anyone who is interested, and will be very grateful for any suggestions for the better organisation of the work.

The Long Journey. Fire and Ice. Johannes V. Jensen. 292 pp. No illustrations. Gyldendal. Price, 7/6.

The original title of this book was Den Lange Rejse, and it has been translated from the Danish by A. G. Chater. It is an attempt to trace in an allegorical and descriptive way the experience of man through the long ages of experience which have moulded him from " a hairy being up in the trees after fruit," to man of to-day, " the gatherer and hoarder of the ages," All such attempts must be full of much that is controversial, and perhaps most readers will begin to disagree even in the second page, where it is stated that " mankind began its long journey here (i.e., in Sealand) in warm forests, but in a northern latitude." Yet all such efforts help, and this particular one, being entirely foreign in many ways to our prosaic insular discussions of palæolithic and neolithic races, and having that poetic mysticism which is so distinctive of the Scandinavian school, should be of much use to teachers of younger children who are endeavouring to make the story of primitive man real and vivid.

THE GEOGRAPHICAL ASSOCIATION.

(TOURING BRANCH).

Chairman :—Mr. E. E. Lupton, F.R.G.S.

Members of Committee :—Professor H. J. Fleure, D.Sc., F.S.A.
Mr. W. H. Barker, B.Sc. (Reader in Geography, Manchester University).
Mr. E. J. Orford, F.R.G.S.
Mr. G. F. Hirst, F.R.G.S.
Miss L. Lee, F.R.G.S.

Co-opted Members :—Rev. O. R. Bradford, A.K.C. (Lond.)
Mr. G. F. B. Chambers.
Miss S. Harris, F.R.G.S.

Organising Secretaries :—Mr. E. E. Lupton and Mr. G. F. Hirst,
73, Bierley Lane, Bradford, Yorks.

THE aim of the Committee is to organise Holiday and other Tours through selected areas, with the object of introducing to the Members, by the help of expert Geographers, the typical geographical features of the districts traversed, and their relation to the history, life and work of the people dwelling there.

A most successful start was made last year, the number of applicants for places being so many that one Tour had to be duplicated. This has encouraged the Committee to enlarge their activities this year, and to undertake the following Tours during 1923 if a sufficient number of Members and friends indicate their desire to join :—

BRITISH TOURS, 1923.

(By Motor Coach starting from Bradford unless otherwise stated).

Tour No. 1.—June 30th to July 7th (inclusive).

THE ENGLISH AND SCOTTISH LAKE DISTRICTS, &c.

This tour is intended primarily for Students taking the Honours Course in Geography at any University. It will be open to other Members of the Association if accommodation permits.

Conducted by Mr. W. H. Barker, B.Sc. (Reader in Geography, Manchester University).

1st Day.—Bradford, Aire Gap, Ribblesdale, Lonsdale, Grange-over-Sands, Windermere, Ambleside.
2nd Day.—Rydal, Grasmere, Thirlmere, Derwentwater, Borrowdale, Keswick, Carlisle.
3rd Day.—Gretna Green, Annandale, Clydesdale, Glasgow.
4th Day.—Loch Lomond, S. Highlands, Lake of Menteith, Callander.
5th Day.—The Trossachs, L. Katrine, Stirling, Bannockburn, Edinburgh.
6th Day.—At Edinburgh till 3 p.m., thence to Galashiels, Melrose, Kelso.
7th Day.—The Cheviots and Border, Northumberland Coast and Plain, Alnwick, Tyneside and Durham.
8th Day.—Teesdale, North Yorkshire and the Yorkshire Dales.

Tour No. 2.—July 28th to August 4th (inclusive), starting from Bradford.

THE ENGLISH AND SCOTTISH LAKE DISTRICTS, &c.

Conducted by Mr W. H. Barker, B.Sc., & Mr E. E. Lupton, F.R.G.S.

This Tour, the route of which is similar to the one outlined above, is open to all Members of the Association. (Fares for Members and Non-Members quoted over.)

Tour No. 3.—August 8th to August 15th (inclusive). Starting from Bradford.

THE NATURAL REGIONS OF CENTRAL AND SOUTH BRITAIN (including the Marches of Wales).

1st Day.—The Pennines, Chester, Llangollen, Shrewsbury.
2nd Day.—Welsh Border, Ludlow, Hereford, Ross-on-Wye.
3rd Day.—Lower Wye, Tintern, Chepstow, Gloucester, Cotswolds, Bath.
4th Day.—Mendips, Cheddar, Wells, Sedgemoor, Yeovil, Dorset Downs, Bournemouth.
5th Day.—New Forest, Hampshire Basin, Bagshot Heath, Windsor.
6th Day.—Stoke Poges, Henley, Chilterns, Thames Valley, Oxford.
7th Day.—Aylesbury, Bedford, Huntingdon, Fenland, Peterborough.
8th Day.—Midland Plain, Nottingham, Dukeries, S. Yorkshire.

Tour No. 4.—August 18th to August 25th (inclusive). Starting from Bradford.

THE ENGLISH AND SCOTTISH LAKE DISTRICTS, &c.

Conducted by Mr. G. A. German, M.Sc., F.G.S.

(Similar to Tours 1 and 2. Open to Members and friends at fares quoted below).

Whit Week Tour.

A few friends have expressed a desire to join a **9 days Tour to Scotland during Whit Week.** This tour will include the West Coast of Wigtownshire and Ayrshire, and proceed as far north as the Gorge of Killiecrankie. The English Lake District will be traversed on the return journey. Will others who wish to join kindly communicate with the Hon. Sec. (Mr. E. E. Lupton).

FOREIGN TOURS.

Tour No. 5.—With the kind assistance of Members of the Alpine Club and others the following tour in Switzerland has been specially arranged:—

22 DAYS REGIONAL TOUR TO THE BERNESE OBERLAND, &c., August 6th to August 27th.

Conducted by Rev. O. R. Bradford, A.K.C. (Member of Swiss Alpine Club).

Synopsis of Route.—London, Dover, Calais, Bâle Lucerne (2 days).
Engleberg and District (5 days).
Walk via Jock Pass to Innertkirchen (2 days).
,, ,, Grosse Scheidegg to Grindelwald (5 days).
,, ,, Kleine Scheidegg to Lauterbrunnen (2 days).
,, ,, Tschingel Pass to Kandersteg (4 days).
Return via Berne, Paris and Calais.

The walks are not too strenuous, and are well interspersed with easy days when walking is entirely optional. All the longer pass walks may be obviated by taking train if desired. (Additional cost £1 13s. 2d. if a combined ticket is taken). Visits will be made to the interesting places around each centre, and addresses and lectures given in explanation.

Inclusive Fare:—Members, 24½ guineas; Non-Members, 25½ guineas.
The fare includes 2nd class travel, 1st class on steamers, 3rd class on mountain railways. Full hotel accommodation at superior hotels; all gratuities. Kurtax and conveyance of luggage where necessary. The tickets are valid for 33 days, and Members may extend their stay if desired up to that limit. The quotation is on the assumption that the party numbers 25. For further particulars apply to Miss L. Lee, "Melford," Walpole Road, Boscombe, Bournemouth.

Tour No. 6.—14 DAYS TOUR IN THE PARIS BASIN (with special attention to the Cathedrals of the district and the Chateaux of the Loire).

August 1st to 14th.

Conducted by Miss S. Harris, F.R.G.S. (Assistant Lecturer in Geography, U.C.W., Aberystwyth)

It is proposed to visit the following places en route:—

(1). Boulogne, Amiens, Beauvais, Paris, Avallon, Dijon, Beaune, Autun, Nevers, Bourges.
(2). Tours, Angers, Le Mans, Chartres, or Tours Blois, Orleans.
(3). Paris, Rouen to Le Havre. (If possible by steamer down the Seine).
(4). Southampton and Winchester.

Tour No. 7.—14 DAYS UP THE RHINE AND TO THE BAVARIAN HIGHLANDS (circumstances permitting).

Tours 6 and 7 will be undertaken if 25 or more Members indicate their desire to join.

Quotation of Fares, etc., will be communicated on application to the Hon. Sec. (Enclose stamped addressed envelope for reply).

CONDITIONS OF BOOKING, etc.

1.—The number of passengers on the British Tours is limited to 24 per tour, and bookings are accepted in strict order of application. Each tour will be accompanied by a Lecturer, who will give his services in indicating and explaining all the interesting geographical problems, etc., met with en route.

2.—Every care will be taken to ensure the safety and comfort of the members, but it must be understood that no liability whatsoever is accepted by the Committee for loss of tickets, luggage or other property, nor for personal injuries or sickness occasioned by accident, weather, detention, or any other cause.

3.—The programme and routes will be adhered to unless there are urgent reasons to the contrary, but the right to alter any of the routes is expressly reserved if considered expedient. It is impossible to guarantee that any particular route will be followed or that accommodation will in every case be found at the particular hotel advertised.

4. Special accommodation is provided on the motor coaches for luggage, but the Committee accepts no responsibility in any form for the conveyance or safety of members' luggage. It is strongly urged that hand luggage only be taken. The parties cannot on any account be delayed for the convenience of members bringing unwieldy luggage.

5.—The Inclusive Fare for each of the Tours in Britain, **1, 2, 3 & 4,** is **£12 10s. 0d.** This includes Motor Fare, First Class Hotel Accommodation, Mid-day Lunch, and all gratuities. (The Whit Week Tour will cost £14 0s. 0d.)

6.—A Booking Fee of **Five Pounds** is required at the time of booking, the **balance** to be paid **One Month** before the date of the commencement of the tour.

7.—If, owing to unforeseen circumstances, a tour should be abandoned by the Committee, all payments will, except where otherwise stated, be returned in full.

8.—Members who have urgent reasons for withdrawal may generally do so, except where otherwise stated, up to within two months before the tour commences for which entry has been made. If a substitute can be provided the deposit is returned in full. Otherwise a fee of 10/- is retained for cancellation expenses.

9.—Intending passengers are asked to communicate as follows:—

(a) For further particulars of the Swiss Tour, with
Miss L. Lee, F.R.G.S.,, "Melford," Walpole Road, Boscombe, Bournemouth.

(b) For particulars of the British Tours, etc., and **All Bookings** to
Mr. E. E. Lupton, F.R.G.S., 73, Bierley Lane, Bradford, Yorks.
(Enclose stamped addressed envelope for reply).

SPECIAL INQUIRY.

With the object of acquiring a bureau of useful and helpful information for the use of Teachers and others, the Tours Committee of the Association would be most grateful to Branch Secretaries and Members who could supply the following information:—

(1)—Names of Teachers or others, who would give advice and help, Geographical or otherwise, to Members who wished to spend a holiday at any interesting place or in any interesting district.

(2)—Addresses of 'recommended' apartments at any such place or district.

All such information would be gratefully received by the Hon. Sec. (Mr. E. E. Lupton) or by any member of the Committee.

Railway Map of the British Isles. 27½in. x 31½in. Scale 19 miles to 1 inch. Paper Folded. 2/6. Bartholomew.

The Edinburgh Geographical Institute has again distinguished itself by an early appreciation of the need for a map showing the new railway groupings. Notwithstanding the evident speed with which the map has been produced, it possesses many excellent features.

The Decadence of Europe. F. Nitti, translated by F. Brittain. London: T. Fisher Unwin, 1923. 280p., 23 x 15 cm.

In this arresting book the former Prime Minister of Italy compares the Treaty of Versailles with the treaty of 1815, greatly to the disparagement of the modern one, which he looks upon merely as a device for continuing a sort of camouflaged war. To him the great contrast is between the reasonableness of her erstwhile enemies towards France after 1815 and the savagery of the victors towards Germany after 1918. He thinks it would have been possible to satisfy reasonable claims for self-determination without Balkanising Europe. The only hope, in his view, is in the forgiveness of debts all around, the withdrawal of armies of occupation, and the re-establishment of economic relations on a stable basis.

What one misses in this, as in most political discussions, is any indication of an understanding that the growth of communications and heavy commerce has made the historic sovereign-state a very questionable institution. They are so concerned with the actualities of the moment that they make fixed points of what are passing phases, and so hinder the adjustments which it is their duty to assist. If the treaty makers had started with the realization that for the common good Europe, west of Soviet Russia, must be more and more one unit, and that Vienna, Paris, and Antwerp, not to mention a few others, are nerve centres of most vital importance to Europe as a whole, they could have avoided many proved follies. They might even have indicated or outlined the possibility of smaller units for the more cultural purposes within larger economic ones. Why should we not have an international commercial-consular service as a beginning of the economic unity that we so sorely need?

The British Isles of To-day. Citizen of the World Geographies. J. F. Unstead. 1922. 3s. viii. + 184 pp. 19 x 13 cm. Sidgwick and Jackson.

The chief sections of this interesting little book are "Britain in the Making," "Climate of Britain," and Regional Descriptions, the last with suggestive maps of natural divisions, though, of course, there will be divergences of opinion as to the divisions taken. Professor Unstead uses several geological maps in his arguments, but though the physical side is much emphasised, he is alive to folk character, and gives interesting quotations. There is a welcome advance in the discussion of race problems, but the pages on the making of Britain might well be reconsidered. Phases which should stand out in any account of the making of Britain are the Norman contacts spreading a stream of Roman inheritance, the gradual rise of wide maritime interests following the voyages of discovery, the enclosure of common fields, and the consequent revolution in village life as well as the coming of industrialism.

THE PEASANT AND THE SOIL.

AN INCIDENT OF EASTERN EUROPEAN LIFE.

IN the days before the war Anna Drega lived in the village of Podkreyestwo, in the province of White Russia. She was strong and industrious, and by her own work and the work of her husband, she had made for herself a comfortable home. Six children she had borne and reared there, and although the two elder boys had gone to America, there were still left two daughters and two sons to care for her old age and to keep the field tilled when she and her Peter should be too feeble to work.

But that time was long ahead. Anna was barely forty and no woman in the village could do better weaving. Her sons and daughters were clad in the homespun linen she made for them from the flax that grew in their own field, and the gay festival clothes of striped red wool were also spun and woven by her skill. There was no kind of household art in which she was not industrious, and every moment of the day-light was filled with her toil.

Since Peter, her husband, was as industrious as she, it was no wonder that they prospered. The land, it is true, was not very good, not like the rich black earth of the Ukraina, a little to the south, but still Peter owned of it 10 dessiatins (25 acres), enough to constitute him a fortunate peasant. He had a cow and a good horse, and every harvest time from his labours he received enough potatoes and rye to feed his family till next harvest, and to exchange at the market town for other necessities and to offer hospitality to the poor.

At first the war hardly touched them. Peter was too old for service in the field, his two grown sons were in America, his younger sons were children. But after a year in which the German and Russian armies fought back and forth some hundreds of miles to the west, there came the Great Retreat. Orders were that all peasants must move eastwards into Russia.

Before Anna left, many Russian soldiers came through the fields and took the harvest they had just gathered. They took also the hay and the cow. They paid no money, but they gave to Peter a piece of stamped paper, saying that some day he would be paid by the volost. Anna still has that little piece of stamped paper; there is no Allied War Loan to honour the debts made by the Russian Generals in the Great War. The volost has belonged to Bolshevik Russia and now belongs to Poland, but none of all these Governments has yet paid Anna.

Anna and Peter Drega and their family took the horse and cart and what food they could carry and set out on their long journey to an end which they did not know. At first they tried to follow the main road, but these were jammed with hundreds of soldiers and heavy artillery, and motor cars which were dangerous to horse-carts.

It was in the great forest that Peter died. The sickness came on him because of the bad water. All wells were dried from the great passing of the people, and the little holes which the refugees dug in the forest were quickly choked with mud and disease. Yet one must drink something, for thirst was a constant torment. They drank even from pools in the road. Cholera and typhoid were plentiful, no one ever knew which Peter died of, for there was no doctor.

There passed many more days of walking through that endless forest, and then another death delayed them. This time it was Anna's sister, who had been travelling with them, her daughter Olga was left an orphan, in Anna's care. So for a time Anna was the mother of five on the journey, but soon the number fell to four again by the death of her youngest son.

In every case it was the same, the sickness, the waiting by the roadside while the autumn grew colder and the winds swept more bitterly from the north, then the death and burial and the grave with a rude wooden cross above it. After all this, they at last came out of the forest.

It was now two months since harvest time, when they had left home. The season was far advanced, the weather was cold. They could go no further by cart. By this time the Russian Government was handling the transport of the refugees by train, so Anna with four children, three of her own and one of her sister's, was put in a crowded box-car and travelled by slow stages to the interior of Russia. The horse and cart could not be sold, there was no one who wanted them. They were simply left behind at the station, and in giving them up, Anna knew she gave up all chance of a comfortable peasant life again.

It was a year later that Anna found herself in a little village to the south of Buzuluk, in the province of Samara. In those days all the provinces along the Volga were rich in food, and the refugees had been quartered on the population. In Samara one person in every four was a refugee, so great had been the influx from the Great Retreat.

Anna and her children were sitting miserably along the wall in a peasant's cottage. For a whole year they had been unwanted guests. At first they were welcomed hospitably, as peasants in misfortune, then they were tolerated because of the small government subsidy, but now the government subsidy had stopped and these refugees were a burden, none too graciously borne. For over a year this woman Anna, so used to filling her days with labour, had known the bitterness of dependence in a house where she was not desired. Somewhere in Perm she had a brother-in-law, but she had no money to reach him. All she asked was a chance to do any kind of household work.

The Society of Friends were gathering the neediest orphans from the village to take to the home at Mogotowo. Before starting they needed a midday meal. Anna was employed to cook the meal. A few days later another group of children passed through, and again Anna cooked for them.

For a time she was cook at the children's home. But she was always more than merely a cook. She gathered to her own heart the children who had lost their mothers, and in her kindly Russian peasant fashion she rejoiced to give them back what they had lost.

After a time the rheumatism which had come to her on the long cold journey from Poland, grew worse from much standing, and Anna could not work in the kitchen. She was given a job at weaving at one of the looms which the Friends had set up in a large work-room, to give support to women like Anna, and to produce clothes needed for relief. Anna made beautiful clothing, strong and firm.

She was happy because she again had work to do, and though at times memories of the past would overcome her, and she would sit and weep over her loom because of her losses, yet she would quickly recover, and be as cheerful as anyone on festival days, when she donned the skirt of striped red wool, that still survived from the happier time when she had woven it in White Russia.

And then suddenly her eldest daughter died from meningitis. After that Anna grew restless at Mogotowo. She wanted to find someone from her own people. She had saved enough to travel, and so, in the spring of the year she set out for Perm, seeking her brother-in-law.

She found him, but he also was working for board and lodging only, and could give her no help. All through the momentous summer of 1917, when the throne of the Czar was crashing, and government after government was rising and falling, and the armies were breaking on the eastern front and the Allies were cursing Russia—the only incident that remains to Anna from all this tumult was that her brother-in-law did not want her, and her rheumatism grew very bad. She went back to Mogotowo and asked to be admitted again to the home, and again spent the winter in the weaving room while her children grew rosy and well among the other children for whom the friends were caring.

But war again overtook Anna Drega. The distant rumblings of revolution, which she had hardly noticed, took shape at last in armed conflicts between the Czecho-Slovaks and the Bolsheviks, all along the railroad line through the province of Samara. Towns were taken and retaken, and each time life grew harder. In the end it was necessary for the Friends to close the home and to escape across Siberia to America and England.

A great longing for home grew on her. She was tired of Russia, every place was unlucky, every place she went. The Spring of 1920 stirred again in her the memory of the fields that her fathers' fathers had ploughed and sown and subdued—the only fields where she could finally rest. With spirit still unbroken after her many hardships, she set out, at Easter time, with her son and daughter and niece to walk home.

It was a thousand mile journey over strange plains and rivers and across the battle lines of the Bolsheviks and Poles, who were fighting that summer. But luck went with Anna at last. There was no more illness to delay them, day by day they tramped steadily onward, dragging the cart with their household belongings, trading their clothes for food among the peasants as they passed, and often receiving food freely from hospitable ones who understood their misfortunes. Night by night they slept where darkness overtook them, and rose again with the dawn to journey onward. In the fall of the year they came to Podkreyestwo.

Winter was coming on again, and there was no food. The shell of her house was still standing, but the doors and windows were gone. All through the village were burned and ruined houses, and outside the village were fields gone back to wildness. Anna was one of the first in Podkreyestwo to return.

She boarded up her windows, she filled in the door, but she could not keep her family together through that winter. They had to scatter to find food. Ekaterina went to Minsk, where she was offered work, Olga married a young and energetic carpenter, while Alexei, now a boy of 15, found food in exchange for labour on another peasant's land. Their own 10 dessiatins of land lay idle, Anna had no horse to plough and no means to procure these things. With her own hands she dug in the spring a little garden to plant potatoes. That was as far as her strength and means could reach. She span flax for her neighbours and bought more potatoes with it, and thus she managed to live, alone in her broken house, where once she had been the strong mother of six children.

Within a year of her return she had managed to procure glass for two of her windows, the other two were still boarded. The few potatoes she had planted in the spring were gone, for it was now past Christmas. She span flax, with which she hoped to get more potatoes, but the yarn was not yet finished. The only food she had was a few dried currants left from her garden.

She is now making homespun to clothe other women more destitute than herself. Perhaps when spring comes, if the Mission work expands and the ploughing columns reach so far, the Friends will be able to plough an acre of land for Anna and give her some seeds to sow. If this is done, if she has one good harvest, even from a single acre, then with the food she will get, she will bring her son back to help her, and he will work, not on another man's land but his father's. Bit by bit she will hire the ploughing of more acres, till at last, if no more wars come, she will buy herself a horse, and her son will be grown enough to do his own ploughing. Then also, perhaps her daughter can come back, if she is not by that time married, or perhaps there will be a daughter-in-law in the house to help her. A new family will grow up around her old age, in place of those who have gone, and the fields will again be subdued to the needs of her children's children as they were to the needs of her fathers' fathers.

The Central Office of the Association has received from Clark University, Worcester, Massachusetts, publications connected with the inauguration of Dr. Atwood as President in February, 1921, and the organization of the interesting Postgraduate School of Geography at that institution. President Atwood is impressed with the population problem and the need for intensive development and world-wide mutuality based upon real mutual knowledge among the peoples of the earth. Could the motive for geographical teaching and study, which gives our Association its driving power, be more clearly stated? The geographical staff includes, besides President Atwood, such well-known names as those of C. F. Brooks and E. C. Semple, and the whole geographical staff includes seven persons, all of whom take part in advanced work. The schools of geology, of history, and of international relations seem to work in close touch with the school of geography. In 1922 the Commencement Address of the University was given by Emeritus Professor W. M. Davis, who shows therein his accustomed vigour utilised in discussion of the function and scope of a Graduate School of Geography. The syllabuses of lectures, etc., as sent, can be seen by members of the Association who may be interested (please send stamps for reply). They are a good indication of the growth of human geography as a subject. They differ from those in vogue at Cambridge, Wales, and London, and probably elsewhere in this country, in that there is no special reference to map construction and the partly mathematical aspect of the subject. Perhaps this part of their training is given to students in the mathematical courses. The human side is well treated in the syllabus, man being considered in his relation to climate and to land forms more particularly. We note that the question of the races of man is not specifically introduced.

Members of the Association will be interested to know that M. Emil Paul, 100, Faubourg St. Honoré, Paris, is re-issuing valuable reproductions of plans of Paris of different periods copying accurately old maps in various collections. The series includes two plans of Paris in 1530, a plan for 1551 in eight parts, a plan for 1555 in one part, a plan for 1615 in one part accompanied by a pamphlet, a plan for 1652 in nine parts, a plan for 1675 in nine parts, a plan for 1710 in 12 parts, the "Plan de Turgot," 18th century, in 20 parts, a plan for 1737 (Paris under Louis XV) in one part, a plan for 1808 (Paris under Napoleon) in 20 parts, and a plan of Paris under Louis Philippe, 1842. The prices will depend to some extent on the course of exchange, but it may be taken that where a plan is in several parts the set will cost about 10—12 francs, while the plans in one sheet will cost about 1—2 francs, according to our present information, which, however, cannot be guaranteed. Postages in all cases should be extra. Some of the sets are now reprinting.

TYPES AND MATERIALS OF HOUSES IN ENGLAND.

An address delivered at the Annual Meetings of the Geographical Association
by MR. HARRY BATSFORD.

THERE are fascinating possibilities in our subject. Dr. Alfred Russell Wallace, in attempting a definition of the picturesque, has given an excellent little thumb-nail sketch of local building in England in the following words:—"Why are the old cottages so invariably picturesque, so harmonious with the surrounding landscape in form and colour, as to be a constant delight to the artist and lover of Nature? The answer, I believe, is because they were the natural product of the time and locality, being built by the very people who were to live in them, with materials found in the district and in the style which experience had shown to be at once the most convenient and the most economical. The first owners of these old cottages, the men who built them, were either freeholders or copyholders, or those who had obtained land on lease for several lives, and they were actually erected in part by the men themselves, with the assistance of their neighbours, the village carpenter and mason. The materials were obtained either from their own land or from the moors, wastes and woodlands, which were then open for the use of all the inhabitants of the manor. The walls were of rough stone or of brick, or timber-framed, with rough-hewn wood in the upper storey, forming those charming wood-framed houses of Surrey, Sussex, Hereford, and other counties (Fig. 1). In Dorset and Devon the walls were often of clay mixed with straw, called 'cobble,' and this makes a far warmer, drier, and altogether more desirable dwelling than the modern brick, as many of the old cottages, which have lasted for centuries, prove. The roof, framed with rough posts, and with poles for rafters, has a slight irregularity of outline very pleasing to the eye when compared with the rigid straightness, flatness, and angularity of roofs built with machine-cut timber; while the thick covering of thatch, broken by the small rounded dormer windows and with the broadly overhanging eaves, is not only far warmer in winter and cooler in summer than any tiled or slated roof, but has the intestimable advantage to the labourer that he can repair it himself."

At the outset we have to decide whether we will follow in the main a time or place classification. This is a distinction which is always cropping up, and I think you will all agree that it is far preferable, at a meeting of the Geographical Association, to try to study the varying characteristics of buildings in different parts of England, rather than to trace the evolution of style as the centuries pass by, an aspect which has been tackled in a number of text books. I take it that geography in the wider sense in which it is now taught and studied, is concerned as one of its principal features with the investigation of local characteristics and differences, and in building there is an extremely interesting province, in the enjoyable study of which all of us can take part. The subject has never been, perhaps can never be, fully and completely investigated, and offers a fine field for recording and comparison in which there is work for each of us.

We all know that there are well marked styles of building in different parts of England; let me give you an excellent instance. When you stand by Broadway Tower, on the steep northern escarpment of the Cotswolds, and look over the "coloured Counties," as Laurence Housman described them, you see the valley of Evesham laid out at your feet, from that commanding height of 1,000 feet. Behind you all the villages are built wholly of limestone. Broadway village itself, on the lower slopes of the hills, is the last outpost of the Cotswold style. The Worcestershire villages in the valley are totally different, and constitute very charming examples of half-timber and brick.

The local manners of building in England depend largely on the materials available, and these again are chiefly conditioned by the geology of the district. From the map prepared by Mr. Sidney R. Jones for his "Old Villages in England," published as a Studio Extra Number in 1912, can be seen a number of the formation areas into which England is divided. First we observe the large central strip of oolitic limestone, which runs from Portland and the Severn in a North-easterly direction to the Humber, and indeed to the Tees. This supplies an excellent building stone, of which the Cotswold craftsmen, the mediæval Church builders of Northamptonshire, and others, made excellent use. In the Weald of the South East and in the West country by the Welsh border, there is abundant timber, and clay for brickwork can be found in most parts. The West country also has a less adaptable sandstone, and in the South West there is granite and sandstone, and in the North varying kinds of hard stone. Thus England, for a small country, has quite a number of formations which supply building materials. Frequently several occur in one particular district, and therefore may be found in the same building, often with a delightful effect of varied texture when mellowed by time. Generally it will be found that the village buildings follow pretty steadily and faithfully the geological outcrops, but there is need for careful recording and the preparation of well marked comparative maps. It must be remembered, also, that timber and brick earth occur almost everywhere, and gave the craftsmen alternatives of which they naturally availed themselves readily. The same materials produced distinctly varying results in different districts, according to the local treatment, and style also differs in early or late periods,—compare Figs. 2 and 3.

Often one particular material or combination is predominant in a district, but the craftsmen generally used all the materials they could, and often with a very keen sense of their qualities and limitations. Shropshire, for instance, is usually described as a half-timber county (Fig. 2), but there are a number of houses in stone and some very interesting productions in brick. The chief exception to this is in Norfolk and Suffolk, and some other chalk districts, where a rather restricted use is made of flint for house building, although the mediæval Church builders in East Anglia carried their craftsmanship in this refractory material to an extraordinary pitch.

There is, however, a distinctly local school of construction in flint in Wiltshire, in the river valleys round Salisbury. Some houses are built with a chequer of flint and stone, as is often seen in East Anglian Churches. Others have a mixture of flint, bricks and lumps of stone. The villages of the Bourne Valley, near Andover, have a filling in the half-timber cottages of alternate layers of flint and brick, a treatment which it is curious was not adopted more often. Flint is also used to a considerable extent, but with duller and less varied methods, in the cottages of the Chilterns.

Again, in a clay or brick district, patches of rough stone will occur, as in Kent and around Godalming, and these give rise to little islanded areas of stone buildings.

But like everything else the effort towards the differentiation of local house types can easily be carried too far, for, building in a free tradition, the old craftsmen did not consider themselves bound by any rigid canons of style.

For reasons of time it is necessary to confine our glance to house building, but the study of the styles of Church building due to place, as opposed to time, is one of exceptional interest; it was almost entirely neglected by 19th century archæologists, but is now being worked out. Their design differs enormously; in the limestone belt, and adjoining it, there are the fine spired stone Churches of Northamptonshire, Lincolnshire, and the Fens; in stoneless districts there is a type of small Church built of rubble, and in Essex there is ingenious and resourceful use of brick for towers and fabrics, and timber even for arches. In the West occasional resort was made to half-timber, and we have already referred to the flint construction and ornamentation in Norfolk and Suffolk. In the South West the use of granite gave rise to a very severe type of building, but the craftsmen compensated for this by a profusion of riotous ornament inside, in his woodwork. Mr. F. E. Howard, of Oxford, has recently shown, in conjunction with Mr. F. H. Crossley, of Chester, that there are very well defined schools of local Church woodwork.

The types of house building vary most in different parts in the case of the humble every-day house—cottages, farm-houses, stables, barns, small manors, and so on, rather than in larger houses, which were often designed by special surveyors or architects, and erected by craftsmen imported from a distance. Occasionally, indeed, they used special materials, like terra cotta, in the days of Henry VIII. Sometimes, especially at the commencement of a new period, the influences of style predominates over that of material or locality, and it is often difficult to tell at a glance from what district come the stone built houses of Elizabethan and Jacobean times. That does not mean that some large houses do not manifest local characteristics in a high degree.

It has been suggested that no purely agricultural district has ever produced a fine style of domestic architecture. That, perhaps, is rather too sweeping a statement, but there is no doubt that the possession of an industry meant an enormous stimulus to fine craftsmanship; thus the wool trade had much to do with the beautiful houses of the Cotswolds and of East Anglia. The village of Kersey, in Suffolk, which is full of fine examples, once produced a cloth known as Kerseymere.

It is very interesting to try to work out the influence, not only of material and climate, but also of the psychology of the district. This kind of thing can, of course, be overdone, but there is no doubt that the buildings of this class do express the Englishman's love of neatness and order, his efforts towards homely comfort, and his pride in his home. To take one instance, in looking at Yorkshire examples, with their stump chimneys, small windows, and general air of defensive severity, we are bound to think of the big bare hills, often wild weather, and reputedly dour character of their inhabitants.

There are often little district mannerisms, which are of distinct interest, and much can be done to record them. In Surrey, the wide mortar joints in masonry have often pressed into them a number of small bits of local ironstone. In Wiltshire, Hampshire, and elsewhere, farm walls are frequently built of clay, chalk or rough flint, and as a protection against the weather they have their own little thatched or tile roof. In Northamptonshire is the custom of building with a colour difference, obtained by using in alternate layers a red stone and the yellow-white limestone. Round chimneys of farms and cottages are found in West Somerset, in Pembrokeshire, and in Cumberland. Many other features are noticeable, such as the custom in Kent and Sussex of having a little gablet on the roof where the hips join the main ridge.

Quite a number of yeomen's houses in Kent and Sussex, especially the former county, date from the 15th or early 16th century, and were originally of the central hall type, but this has been floored over at quite an early date. The cottage at Broad Street, Kent, is an excellent typical example.

The East Anglian craftsmen delighted in elaborately patterned chimneys. Frequently Tudor houses have been remodelled and plastered in Georgian times, and the panelled stack, as at Clare, Suffolk, is the only reminder of its original date. A very complete style was worked out in brick with finials, windows, and everything carried out consistently in the same material, as, for instance, at Little Hautbois Hall, Norfolk. It is interesting to compare this with the parallel development worked out equally thoroughly and consistently in stonework, as in the Cotswolds. In the 17th century, in a later type of brickwork, the houses have pediments over the windows, as in the well-known example at Wroxham. Diapering of dark blue bricks was used with excellent effect in a number of houses.

In East Anglia many half-timber houses have been plastered all over, and such villages as Lavenham and Kersey are full of these examples. If Norfolk shows the highest evolution of brickwork, it is to Essex and the Cambridgeshire and Suffolk border that we must turn for the most numerous examples of the craft of exterior plasterwork or pargetting. Even comparatively small cottages are adorned with panels, often carried out in rough cast plaster between smooth or ornamental divisions, and having a central device in each panel. An alternative treatment is to have impressed patterns, such as the basket, looped, diagonal or radiating fan types. These occur in such villages as Great Chesterford, Newport, etc. More elaborate examples are covered with coarsely modelled ornament, which, though its details can be adversely criticised, has, nevertheless, a good general effect. The well-known examples at Saffron Walden have been severely restored, but one of the most effective of the Early Renaissance is the cottage at Wyvenhoe, scheduled as specially worthy of preservation by the Historical Monuments Commission. There are other examples at Clare, and the so-called Nell Gwynne house at Newport, Essex. This treatment continued during the first years of the later Renaissance, and examples at Shopland and Wakes' Colne show that it was used at the end of the 17th and beginning of the 18th centuries. Occasionally in the Southern Costwolds the occurrence of a rather porous variety of stone has led the builders to plaster the houses as a protection against the driving rain, and the result simulates an East Anglian example in a curious way, as at Yelford. Weatherboarding is a method of protecting half-timbered houses, chiefly found in South-East England, as Fig. 4.

Many of these cottages are thatched, and it is interesting to attempt to note the different local varieties of treatment in this material. In Norfolk the supply of reeds has led to an excellent tradition in thatching, and a number of Churches are still roofed in this way. In Essex and Cambridgeshire the roofs are high pitched, and the thatch over the gables and dormer windows is carried up to a high peak and finished at a point with an interlacing pattern of twigs. This differs from the rounded treatment of Berkshire and Buckinghamshire, where the thatch is brought down a good way over the hip of the roof. An Oxfordshire range is shown from the charming village of Great Tews, Fig. 5. The valleys on thatched roofs are frequently carried out in tiles. The thatch of the cob walled cottages of Devon and Dorset is again different. It is not easy to describe in a few words the difference in character, but the West Country thatchers seem sometimes to aim at a peculiarly smooth velvet finish of their work. But the thatch, like the cottages, is rambling and casual, and wanders picturesquely around corners and on different levels.

As already mentioned, a number of the larger Jacobean houses in Shropshire are carried out in stone, such as the big house at Wilderhope, now a farm, Shipton Court, Corvedale, and Madeley Court, now ruined and dilapidated. In Wilderhope, the chimneys, according to local custom, are finished with the stacks in brickwork, parallel to the South Eastern treatment of the rough stone in Sussex. Some Cheshire farms and houses are also built roughly of stone and roofed with large stone slates. It is interesting to study the varying treatment of the houses of this earlier period in Shropshire and Derbyshire, where, as a rule, they are rather more severe, up to Yorkshire; in this latter county the effect of most houses is austere and stern. Windows are small, there is little ornament or detail, with the exception of a doorway, usually provided with a travesty of the classic orders; the chimneys are squat, and the roof is of low pitch, covered with heavy stone slates.

Recently it has been increasingly realised what a delightful and consistent masonry style has been worked out by the Cotswold builders, ranging from the Severn to Northamptonshire, in their admirable limestone. Walls are usually of coursed rubble, and roofed with stone slates, which are cleverly worked round the valleys without the use of lead. Mr. Dawber has shown that the workmen in this material actually have separate names for the slates used in different parts of the roof. The Tudor tradition is stamped indelibly on Cotswold building, especially on its doors and windows. The dormers usually have their own small gables, which often have well worked finials and kneelers, and the chimneys are carried out square or diagonally, in the prevailing stone, as at Weston Subedge, Fig. 6. The study of the methods by which bays are carried up into the gables is interesting, the transition from the canted bay to the straight gable dormer being ingeniously effected. A number of interesting houses of the late 17th and early 18th century are found in the Cotswolds, in which the style receives a more classical expression. These houses have a more usual type of smaller dormer, completely in the roof, but often retain their mullioned windows, as in Fig. 7.

Some of the large stone slated barns with great transepts are particularly interesting in the Cotswolds and Wiltshire, and so are the circular dovecotes also roofed with stone slates.

It is lamentable to think of what we have lost within the last 100 years. A collection of 600 wash drawings made by John Buckler about 1830, shows that Hertfordshire towns, which are now commonplace or slummy, were once picturesque with delightful gabled buildings; the amount of beautiful domestic architecture in the county was amazing. Bristol and Exeter also must have been fairy places before the 19th century put its blighting hand on them. Having first obtained some understanding and knowledge and appreciation and keenness ourselves, there is scope for us to record the old houses with which we are personally brought in contact. Let us ourselves, or by deputy, photograph, draw, collect material, and not even despise to make lantern slides. Framed sets of photographs and prints can be supplied to the local museums, where they will be far more in place than musty whalebones or moth-eaten stuffed birds from the South Seas. The need for comparative maps has already been emphasised.

It is only by the study of comparative examples that the study of craftsmanship in building can be carried out. There is need for small bands of enthusiasts to collect illustrations and notes of old villages, houses, and buildings of every sort in their neighbourhood. The local records thus obtained would then be available for supplement and study by some general central record. This surely is an activity which might be taken up with enthusiasm by the numerous local branches of the Geographical Association.

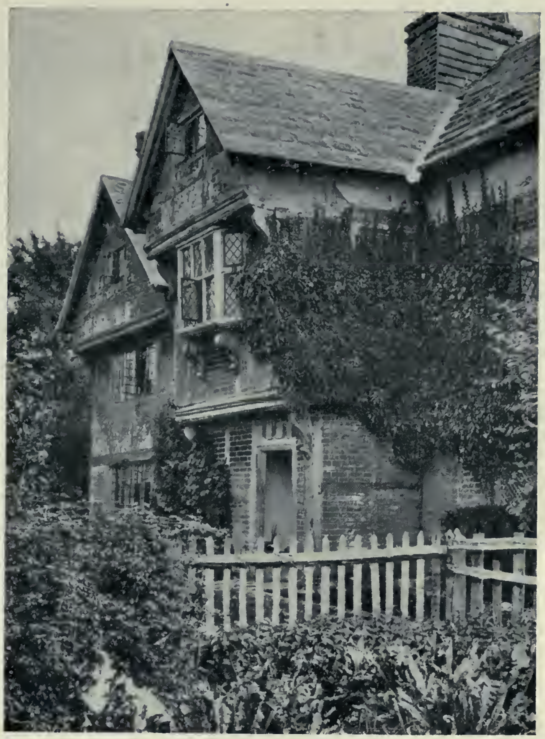


Fig. 1.—The Porch, Bonnet's Farm, near Ockley, Surrey.

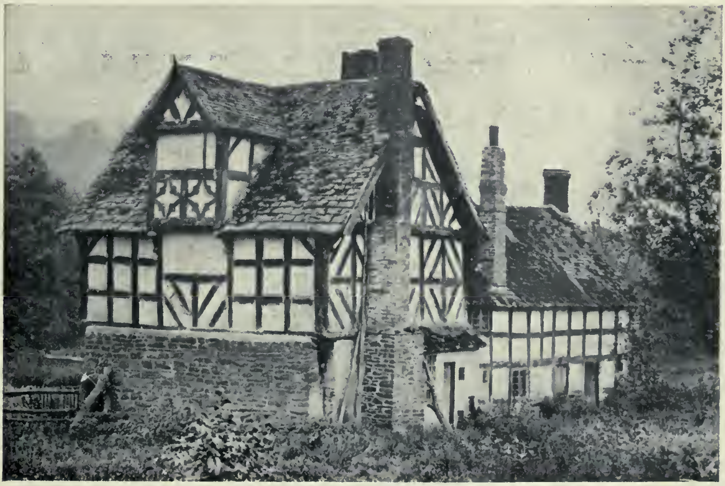


Fig. 2.—Half Timber House at Craven Arms, Shropshire, now demolished.

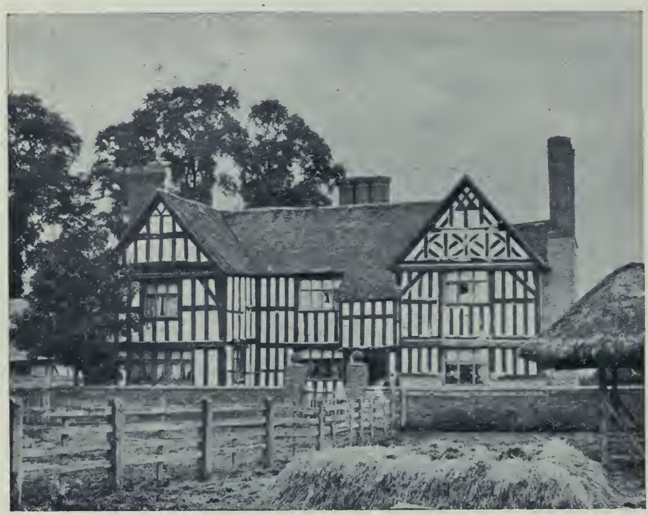


Fig. 3.—Shell Farm, near Droitwich.

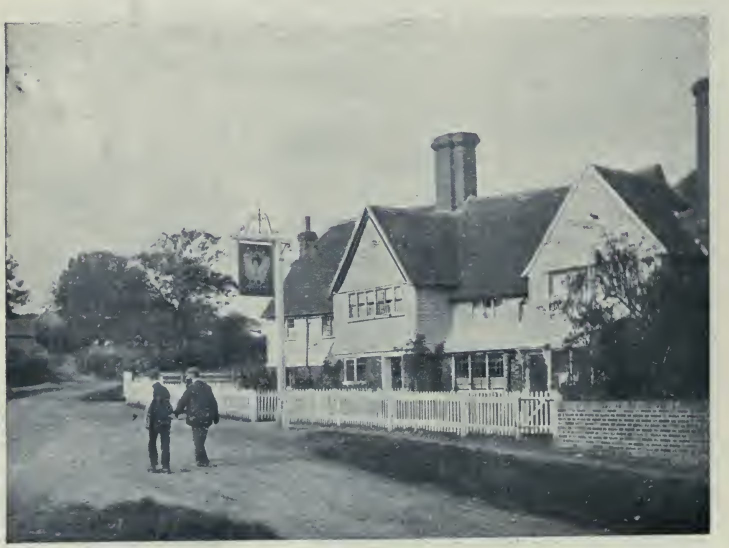


Fig. 4.—The "Queen's Head" (Elizabeth's) Inn, Sedlescombe, Sussex.

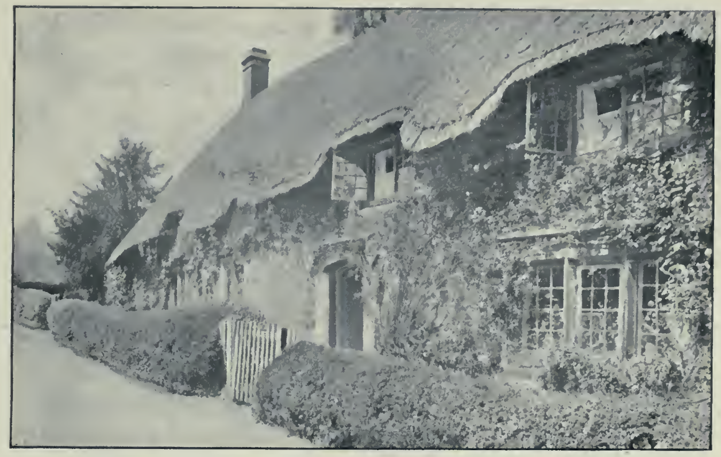


Fig. 5.—Thatched Cottages, Great Tew, Oxon.

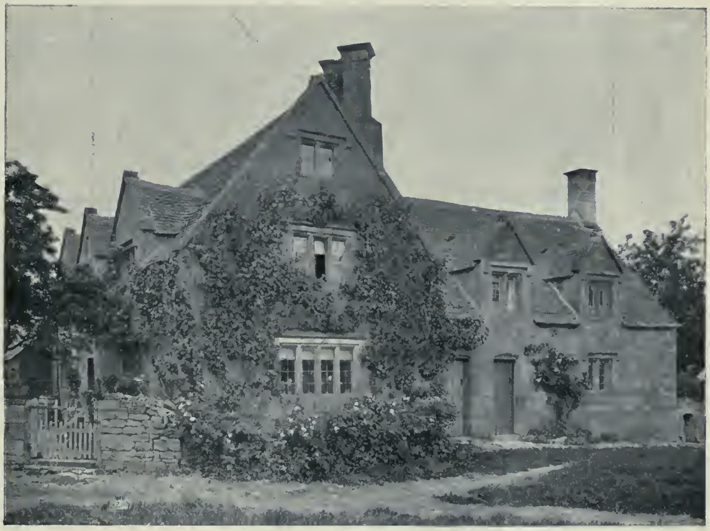


Fig. 6.—Cotswold Cottages at Weston Subedge, Gloucestershire.

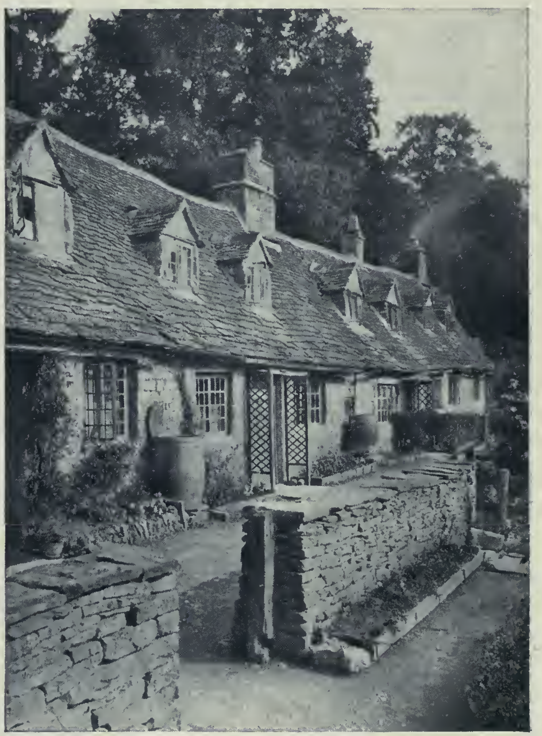


Fig. 7.—Dean Row, Coln St. Aldwyn, Gloucestershire.

THE WEST AFRICAN CULTURE ZONE AND FOREST AREA.

By L. W. G. Malcolm.

ONE of the first investigators of cultural relationships in Africa was Ratzel[1] who recorded certain resemblances which appeared to exist between certain areas of Africa and Oceania. He did not proceed with his investigation, and it was left to Frobenius[2] to make a definite statement that cultural relationships did exist between these two areas. This authority stated that the results of his former studies showed that in Oceania, Australia and Africa the basis of the population was composed of elements from the mixing of two races : one, the older (black and Nigritic), and the other, the younger (brown and Malay). The first was considered to be the continental and the second the insular element. The continental peoples, according to Frobenius, are the most important and show absorbed racial characters. In the work referred to, Frobenius correlates the African (Congo) wooden shields, huts, clothing, musical instruments, wooden drums, pipes, carved figures, masks, anthropophagy and tattooing with similar cultures elsewhere. The West African culture zone he designates Pre-Malayan, which is in much the same area as that covered by the palm-leafed, gable-roofed huts.

Ankermann[3] has also worked on the problem and has determined the extent of certain culture zones in the West African area.

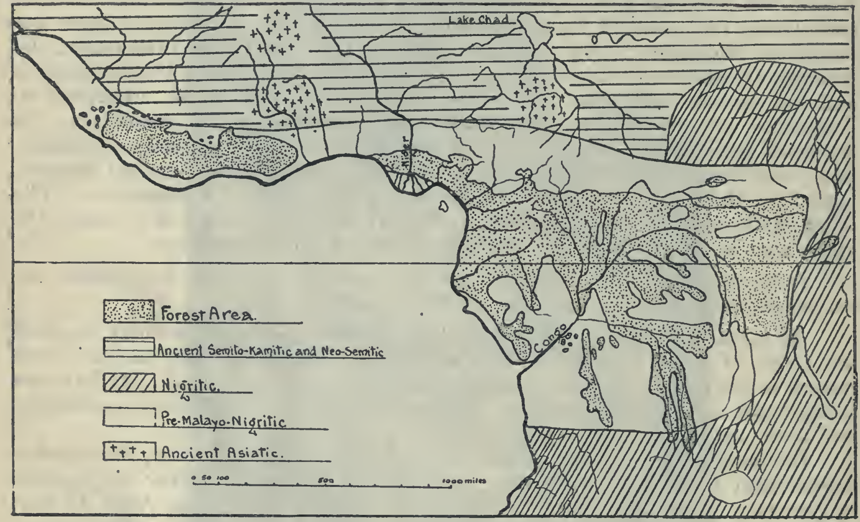
As far as I am aware Montandon is the latest authority to enter the field so far as Africa is concerned, and he has reviewed the whole position with regard to the distribution of weapons and musical instruments.[1] He has also studied the alleged relationships of certain African and Oceanic complexes and their origin.

In considering the term given by Frobenius, Malayo-Nigritic, Montandon argues that the Congo civilisation must have had a much earlier origin than is generally believed. The term which should be given to the West African culture zone is Pre-Malayo-Nigritic, and as such I am using it in the present communication. Ankermann also considers that this culture is derived from the Pre-Malays, or, if not, it is very closely connected with them. It is assumed that it entered Africa by way of Madagascar, whence it made its way, *via* the Zambesi, to the West Coast. According to Montandon it could not have come by way of South America and the Atlantic. All along the Madagascar-Zambesi track there are relics of this movement. After its arrival in the West African area other migrations from both the north and south forced this racial element more and more to the west until it reached the area it now occupies.

Assuming that there is a Pre-Malayo-Nigritic element in the West African culture zone, there seems to be at least another probable route. It is firmly established that the Indonesians made long voyages to Madagascar and settled there. It seems not improbable that they might also have reached the West Coast by way of the Cape of Good Hope. It has been pointed out that there are strong Melanesian resemblances on the Cameroon coast.

The more the West African culture zone is compared with that of Oceania the more complicated the problem becomes. Hestermann considers the best description is that given by Graebner, i.e., one of mother-right or the two-class system. Mr T. F. McIlwraith, however, informs me that the dual organisation in those African tribes he has studied, is with one or two doubtful exceptions, practically non-existent. It is not clear on what grounds Hestermann makes this statement.

The elements comprising the Pre-Malayo-Nigritic culture zone in West Africa include horticulture, hoe-culture, banana culture, koko-yam *Colocasia*) culture, kola culture, domestication of the dog, goat, pig, and hen, clothing of bark or fibre, vertical loom, pottery (sometimes coiled), simple flat bow, bowstring of rattan or coiled vegetable fibre, striking clubs (rare), socketed spear blades, shields of wood or plaited fibre, or a combination of both, quadrangular gable-roofed huts, iron technique, double-piston bellows, use of tobacco, wooden slit gongs, drum language, drums with skin tympani and tautening wedges, pan-pipes, crude decorative art, trading currency, cicatrisation, avulsion of the upper incisors, filing of teeth, mother-right, secret societies, mask dances, images and ancestor cult.



With the exception of the iron technique, the skin-headed drum with tautening wedges, guitar, sansa, marimba (xylophone), loom, and the individual origin of the village this culture so resembles the Melanesian that it may be considered community of origin is not improbable.

Montandon ranges his cultures for Africa in the following order :—

1. Austral-Nigritic.
2. Semito-Hamitic.
3. West Papuasian (West Melanesia). Probable.
4. Pre-Malayo-Nigritic.
5. Ancient Hindu. This corresponds to Graebner's Sudan Culture.
6. Neo-Semitic.
7. Neo-Malay.

The most clearly defined of the above is the Pre-Malay-Nigritic, and when examining this zone I was struck with the close relationship it bore to the Forest Area, and in Map I. the two have been plotted together. It will be noted that they correspond approximately, and when further detailed material is available I believe that they may be brought into closer correlation still.

The effect of the Forest Area in confining certain elements of West African culture is most noticeable, more particularly in the Cameroon. The line of demarcation between the Forest and Grassland Areas are very well defined, and from personal observation there is a remarkable dissimilarity between the cultures of the Bantu-speaking tribes in the Forest Area, and the Semi-Bantu in the Grassland Area.[2]

In the neighbourhood of the natural dividing line, more particularly in the Grassland Area, there have been certain influences at work which have given rise to what are known as the semi or quasi-Bantu tribes. The influences, which are mainly philological, have entered from the Forest Area. Conversely, the influence of the Sudan tribes on the Bantu are very slight. The Forest Area appears to have acted as an effective barrier, and the cultures of the Sudan tribes are to be found only on the fringes of the Forest Area.

[1] Ratzel, F., "Die afrikanischen Bogen," Abhandl. der Königl. Sächs. Gesellsch. der Wissensch. zu Leipzip. Phil-Hist. Cl., XIII. (3), 1891, 291-346.

[2] Frobenius, L., "Der Westafrikanische Kulturkreis," Pet. Mitth., 43, 1897; ibid, 44, 1898.

Frobenius, L., Der Ursprung der afrikanischen Kulturen, Berlin.

[3] Ankermann, B., "Kulturkreis und Kulturschichten in Afrika," Zeitschr. für Ethnol., 1905, 54-83, 84-90.

[1] Montandon, G., "Des tendances actuelles de l'ethnologie à propos des armes de l'Afrique," Arch. suisses d'Anthrop. gen., I., 1914, 102 , "La généalogie des instruments de musique et les cycles de civilisation," Ibid. III. (1), 1919, 1-120.

[1] Moisel, M., "Die Grenzen des Zentral—und Westafrikanischen Urwaldes", Mitt. aus d. deut. Schutzgeb., 30 (2), 1917, 171-172.

[2] Malcolm, L. W. G., "Notes on the Cameroon Province (with Special Reference to the Bamenda Division)," Scott. Geogr. Mag., XXXVI., 1920, 145-153.

Business Geography. E. Huntington and F. E. Williams. New York: John Wiley and Sons, 1922. pp. 482. Maps and diagrams. 13/6 net.

The worst feature of this book is its unattractive title, but usage in America may sanction what on this side of the Atlantic is a species of slang. In all other respects this geography of production and grade merits unstinted praise, and its greatest asset lies in its wealth of ideas and suggestions. Students who are familiar with other works of Mr. Huntington will not be disappointed in this volume. It does not claim to compete with volumes on commercial geography. In fact, the authors state that its use should follow Huntington and Cushing's Commercial Geography and precede their Principles of Human Geography. Regional geography is sketched only in broad outline: Europe in forty pages, Africa in eight, and Australia in seven. But this is an advantage if the detail is filled in from some standard book.

The best parts of this stimulating volume are probably those which treat of the varying capacity of races, the relation of wealth to business capacity, and the conditions of business in tropical countries. There is, perhaps, a tendency to over-stress the place of trade in the life of communities, and put material wants and production on a pinnacle, but that after all is the avowed object of the book. We notice that the authors attribute a high degree of inventive skill and originality to Nordic people, and consider them the intellectual leaders of the peoples of Europe. This is in striking contrast to some (Alpine?) anthropologists, who would have us think poorly of the Nordic stocks or at least their labour representatives. There are a few minor errors of fact in places, but these do not detract from the usefulness of the book. Fiji is not an Australian protectorate, and nickel should be added to the North American mineral resources. Every chapter ends with a series of exercises and problems.

R. N. RUDMOSE-BROWN.

English Coastal Evolution. E. M. Ward. Methuen and Co., 1922. Pp. 262. Illustrations and diagrams. 8/6 net.

Mr. Ward has attempted, with a considerable degree of success, to give a regional account of English and Welsh coastlines. Particular attention is paid to the south and east coasts, but no part of the coast line is entirely overlooked. Two preliminary chapters deal with the processes involved in the evolution of coast lines. These are condensed but comprehensive. Perhaps the introduction of mere comparisons with well known coasts outside England would not be amiss in this part. It might help the student to visualize coasts that he has little chance of seeing. The final chapter treats of the relation of man to various kinds of coast lines. This is full of suggestive ideas, but might well be twice the length. The book is never technical, and demands only the most elementary geological knowledge. A valuable feature is a lengthy bibliography, in addition to numerous references scattered through the pages. While the book contains some new matter, its great value lies in the fact that the author has collected much scattered material not easily accessible to the student. It is a volume that no student or teacher of geography can afford to overlook.

R. N. RUDMOSE-BROWN.

SOME ASPECTS OF THE CATTLE INDUSTRIES IN NATAL.

By R. U. Sayce, University College, Pietermaritzburg.

THE Session 1921 saw the establishment in this College of a Geographical Department, which at first consisted of a modest twenty students. As the result of their enquiries, they obtained most of the information, which is embodied in this essay, and which I have checked by my own observations and by conversations with the government officials concerned. A few brief notes on the topography and climate of Natal have been prefixed in the hope that they may help to explain some of the customs to be described.

Apart from a rather narrow coastal belt, which is subjected to a " Chinese " type of climate, the year in the rest of Natal may be divided into a wet and a dry season, the former lasting from the latter half of September until about the middle of April, and being followed by anti-cyclonic conditions, during which there is an almost unbroken succession of bright, sunny days, with sharp drops of temperature at sunset. Topographically the country may be said to consist of a series of plateaux. The highest series in Natal stretches along the foot of the Drakensberg, and sends a number of spurs towards the East. These Highlands or Uplands vary between four and five thousand feet above sea-level. Below them are the Midlands, approximately between two and three thousand feet; then, after another well marked drop, come the coastal Lowlands, with sugar estates and sub-tropical fruits. Each series of plateaux is dissected by large valleys, whose climate, soil and vegetation are often quite distinct from those of the plateau tops. They have markedly greater daily and annual temperature ranges, and are much drier, since the rains from the Indian Ocean are condensed more copiously in the " mist belts," which follow the scarped edges of the plateaux. In summer these valleys are hot and dry, and their typical vegetation consists of Thorn Veld, that is, grassland thickly dotted with species of acacia, which often assume an umbrella habit. The bushes provide shade for animals and shade-loving plants, Thorn Veld occurs in the valleys of the Tugela, Umgeni, Umkomaas, etc. Again, the soil of such valleys is generally more clayey, more compact, drier, and richer in chemical salts than that of the ridges, and these facts are apparently responsible for differences in the pastures.* Low veld pastures consist generally of blue grass, and such " sweet veld " is excellent grazing ground. The high veld areas are covered with the taller Red Grass, which forms " sour veld." In the long, dry winter this grass becomes very coarse and wiry, and is avoided by cattle.

The great problem for the farmer is how to provide food for his stock when the pastures are dry and brown in the winter. Formerly this was solved by moving the animals into another area, and though the practice is gradually being given up, it still persists to a considerable extent. It will be most convenient to consider the sheep and cattle movements separately. To find transhumance of cattle developed in a large scale, one has to go to Basutoland, where half a million cattle are involved, and where their movements are amongst the important events of the year. In Natal it occurs only to a much more limited extent. In 1904 and 1905 East Coast Fever broke out in South Africa, but was most destructive near the coasts, and in the eastern parts, where the rainfall is greatest and tick life most abundant.

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* The grass and grasslands of South Africa." J. W. Bews.

During the next six years Natal's losses in cattle were estimated at over £7,000,000. To combat the disease, restrictions were put on the movements of cattle. A permit is now necessary before moving from one district to another, and if any cases of fever occur in a district, permission cannot be obtained to move cattle out of it. This is obviously a great blow at transhumance.

Economic circumstances are also responsible for a decline of this custom. As roads are developed, it is more profitable to produce cream and butter fat, and near towns and railways intensive dairying is carried on. These phases of the cattle industry necessitate fencing the land into paddocks, and the growing of foodstuffs for winter, since the cattle must be kept in condition if they are to give milk. A generally used winter feed is chopped mealie stalks, stored in silos. Mixed farming is replacing the old ranching in many areas. Incidentally the practice of winter feeding makes it possible to maintain in good condition the oxen that are used for ploughing. It is desirable where possible to plough the land in winter, but frequently the oxen were too poor at this season, and the crops suffered in consequence.

Despite the changes and regulations, cattle migration still takes place. From the Uplands of Natal about Mooi River and Highlands, stock is sent to winter in the thorn country about Weenen and Colenso, where the farmers generally have a second farm for winter pasture. Further to the south cattle are taken from about Ixopo and Polela down into the Umkomaas Valley. In the thorn country the grass may be somewhat less burnt under the trees, and water is at hand in the rivers. Moreover, there is much less likelihood of snow at the lower levels. In early spring the Uplands of Natal sometimes experience severe blizzards, during which there is often great loss of stock, which is already in low condition as the result of the long drought. There is also a certain amount of movement of native cattle near the isolated table-mountains, which are so characteristic of parts of Natal. The six thousand acres, which comprise the summit of Table Mountain, eighteen miles from Pietermaritzburg, are grazed in the summer by the cattle from the surrounding location, fifteen hundred or two thousand feet below.

Whereas the occurrence of disease has had a restricting influence on the movements of cattle, it has made a certain amount of transhumance necessary for horses. From about Christmas until some time after the first frosts, the greater part of Natal is troubled with horse sickness, which is now generally attributed to some mosquito or other insect. The incidence of the disease varies. In some years the Uplands may be only slightly affected, or may be immune altogether, but at other times the tide of disease may submerge even the highest parts of the colony, as was done in 1922, when the losses were exceptionally heavy. Breeding stock from the Midlands is therefore sent for the summer into the Uplands, or Natal horses may even go up into the Orange Free State.

Sheep migrations involve a much greater number of animals than do the movements of cattle and horses. In Natal sheep have a much more restricted distribution than cattle. They are not kept by white settlers below 3,000 feet, approximately. This lower limit appears to be fixed partly by climatic conditions and partly by the occurrence in the summer of a disease known as Blue Tongue. The cause of this is not altogether understood, but since it occurs at the same time as horse sickness, and since the two diseases vary in intensity in the same seasons, it is thought that blue tongue must also be due to insects. Inoculation of the sheep has recently done much to lower their downward summer limit. The chief sheep areas of Natal are, however, still confined to the Uplands.

The most troublesome disease amongst sheep is sheep scab, and a good many regulations are enforced in order to combat it. Dipping is commonly practised, and when the disease has been nearly stamped out in a district, that district is proclaimed a semi-protected area. If, after a period of probation, no further cases occur, the district becomes fully protected. In order to move sheep into a protected area, a farmer must apply to the sheep inspector of his own district for a permit. His flock is then inspected and dipped before starting on the journey. On reaching the protected area, they are met by another inspector, and are again dipped. There appear to be no formalities necessary for moving sheep into a non-protected area. The only restriction is that a flock must not be moved, if any of the sheep have sheep scab, and it is about this latter class of migration that there is waged a constant battle of wits between the inspector and the sheep farmer.

Although some sheep from the Uplands of Natal go into the thorn country, the chief scene of sheep migrations is the country along the foot of the Drakensberg. Here is a strip of grass land country, some thirty miles wide, and extending from Giant's Castle up to Utrecht. It is almost exclusively devoted to winter grazing. Into this area come sheep from other parts of Natal, and from the eastern parts of the Orange Free State and the Transvaal. I am told by one of the sheep inspectors that, although the migrations are rapidly decreasing, about a quarter of a million sheep come over the four or five passes which lead into the Ladysmith district alone. The distances involved vary from twenty to sixty miles, and may occasionally be as much as a hundred.

The downward movement over the Drakensberg takes place from May to the middle of June. In March or April some of the grass on the winter pastures has been burnt, and the young green shoots have sprung up ready for the sheep when they arrive. About July 15th the rest of the old coarse grass is burnt in order to provide fresh grass for the lambs, which are probably born down here during August and September. A flock of sheep during the trek consists of from five hundred to a thousand animals, in charge of a couple of native herd boys. When a farmer has large numbers to send he will probably divide them into separate flocks, and start them off at two hours' interval. They travel in autumn about ten miles a day, and halt by the wayside at night with the herdboys sleeping around them. At the head of the flocks there are often two or three goats. These are bolder in facing obstacles, and lead the way across water courses, while the sheep readily follow their lead. As a rule, however, there is not much difficulty in driving the sheep. Their instincts lead them to lower levels, and the herdboys sometimes have to walk in front to check the pace.

Formerly the old Dutch family moved en masse with the sheep, one son staying behind to take care of the farm. As they were away from their homes, living in their tented waggons, and eking out the larder by shooting various kinds of buck, which were quite common, the old Boer generally took a coffin with him in case of sickness or accidents. Even now a waggon sometimes goes with the flock. It may carry some mealies for the sheep in case the wayside grazing should be very poor, or to help on any weakly animals.

The sheep migrations cause a good deal of friction with farmers along the road, and involve many a competition of wits with the sheep inspector. Sheep already suffering from scab do not start on the migrations, but some cases may develop on the way. If these are discovered the flock would not be allowed to proceed. The inspector generally rides along the top of the Drakensberg, moving from one to another of the four or five passes which lead into his area. If a few cases of scab have broken out amongst the flock, the problem for the owner or driver is to forecast the pass at which the inspector is likely to be, and then to choose another way. Sometimes an infected animal may roll itself in mud, which, of course, conceals its disease. Very often the grazing along the road is poor, and a farmer may wake up some morning to find that one of his paddocks has been well grazed during the night. Occasionally he may unexpectedly acquire a few sheep which have been left in his fields. These, however, will certainly be found to be suffering from scab. Again, the trekkers, in their desire to secure grazing for the return journey, are said to set fire to the grass as they pass, and this may cause the local farmer some inconvenience.

In some areas of South Africa, and in parts of Natal, jackals cause destruction amongst the sheep and lambs, but they do not appear to be very troublesome in this winter grazing area, so it is not necessary to drive the sheep into kraals for the night. Kraaling is only practised during the lambing season. The huts of the herders are roughly built of mud, and are thatched with grass or with branches. Sometimes a well-built house is occupied by a white man employed by a large sheep owner. This man takes charge of the flocks during their two migrations, and during their stay in the winter pastures. If the sheep are in the charge of natives, the farmer or his sons will pay them a visit from time to time.

The journey back to the Orange Free State and the Transvaal is made in September or October. This time the travelling is slow, because the flocks now include the young lambs, about a month old. Instinct is again noticeable. The sheep are anxious to return, and become restless as the weather gets warmer. If a ewe is delayed behind the flock on account of a weak lamb, she will eventually find her own way back to the High Veld. If the spring rains have fallen early, and pasture is good, the sheep are sometimes taken up to the Orange Free State before the lambing begins. Sheep owners in Natal may also send their flocks up over the Drakensburg for summer to avoid blue tongue.

The custom of transhumance has advantages and disadvantages. Although it is officially discouraged, the following arguments in its favour must not be overlooked:

(1) Transhumance is the only alternative to growing winter food stuffs, which is an uncertain undertaking. Mangolds, barley or oats are sometimes sown in the autumn, and a crop of green fodder can be reaped if some late summer or autumn showers fall after the sowing. Otherwise there may be no yield, and, therefore, no food for the winter. The natural veld cannot produce either milk or wool during the dry season.

(2) If there is winter pasture available not far away, it is cheaper to move the sheep than to grow crops for them.

(3) Change of pasture is sometimes beneficial to the animals.

(4) A change of stock may improve the pasture, since different animals eat different weeds. Sheep eat probably 90 per cent. of the troublesome weeds, and it is said that in the Transkei the flocks have caused the disappearance of much coarse grass and its replacement by other varieties.

(5) The new grass that springs up in the winter pastures after burning the old, is of more value than dry food to the lambing ewes.

(6) Much of the thorn country is too dry for agriculture, and in the large valleys the steep slopes, thickly strewn with boulders of dolerite, are unsuitable for cultivation.

(7) It is sometimes necessary to move the sheep to greater altitudes for the hot weather to avoid blue tongue.

In spite of these advantages, transhumance is steadily declining, and amongst the contributory causes the following may be mentioned:—

(1) Areas of winter grazing are only utilised during one season. For the rest of the year they are making no return, and are, therefore, uneconomic. A sheep owner who does not own a winter farm will have to rent one. Two to three thousand acres will cost him £75—£150. As the population increases, these rents are constantly rising.

(2) Land is steadily being fenced, and patches of open veld along the roads are becoming scarce. There is, of course, a certain amount of grass by the wayside, but if three or four flocks have already passed this way, there will not be much grazing left for the next. The later flocks often experience considerable difficulty in finding sufficient food, and many animals may be lost.

(3) During a long journey the sheep lose condition, and many lambs die on the journey to the summer pastures. As the result of their poor condition, there is a tendency to develop a weak spot in each fibre of the wool, which decreases its value to the manufacturer.

(4) During the long road journeys the fleeces become impregnated with dust, and discoloured.

(5) The movement of stock is often instrumental in spreading disease, and makes the application of preventive measures more difficult. Farm houses are nearly always built some distance from the roads in order to avoid dust and disease caused by migrating flocks.

(6) The introduction of better breeds and of pedigree animals is partly the cause, and partly the result of improved methods. Winter feed is being more largely grown, the grazing lands are being fenced into paddocks, buildings for winter shelter are being built. With all this there goes a decrease of the continual and aimless tramping of the veld, which was so largely responsible for the initiation of dongas, soil erosion, and the lowering of the water-table.

These notes may be concluded by the mention of a few points in connection with the communal pastures of South Africa. Before the development of railways and motor traffic, most transport was done by waggons, drawn by a team of usually sixteen oxen. All places inland were supplied by this means, and consequently there were considerable numbers of cattle passing and re-passing along the roads. It must also be remembered that transhumance of cattle was important. Provision had to be made for all these animals by establishing outspans at intervals along the main roads. The outspans average perhaps about two hundred acres, but may be considerably larger. They are indicated by cairns of stones, and occur at intervals of ten or twelve miles. Each town also had to have its public outspan. They tend to be neglected now, since long distance transport has nearly ceased in Natal, but even yet, if a man can prove that he has driven cattle twelve miles from the last outspan, he can claim grazing for them from a wayside farmer.

Each town has an extent of commonage, which varies greatly in size. Greytown has about ten thousand acres, while the town and town lands of Pietermaritzburg cover about twenty thousand acres. Formerly many town dwellers had their own transport oxen, and even yet many burgesses keep their own milking cows. Each town appears to make its own regulations with regard to the use of its commons. Some of the smaller centres, consisting of not more than a score or so of houses, and having eight or nine hundred acres of common pasture, make no restrictions as to the number of cattle each man can turn out to graze. In Pietermaritzburg each householder can claim free grazing for eighteen cattle, or for forty cows if he is a certified dairyman. The general supervision of the public grazing lands is the duty of a town ranger. Some towns also employ a native herd boy, who collects the cows in the morning, drives them out to pasture for the day, and brings them home again in the evening. The cows break away from the herd as it passes down the street, and each one makes its way to its own stable. The wages of the herdboy are subscribed, in some cases at least, by the owners of the cattle.

As the result of East Coast fever regulations the town lands had to be fenced off into paddocks. In Pietermaritzburg each owner stated the amount of land he required for his cattle, and was given fencing material to enclose it, being charged a small rent. Practically the whole commonage is now enclosed, and it will be interesting to see whether it will ever relapse to its former condition as the menace of fever passes away, as it is gradually and steadily doing.

Peking, A Social Survey. S. D. Gamble and J. S. Burgess. 14 x 23 cm. 538 pp. Oxford Univ. Press. 1921.

This important work marks a new era in the method of missionary effort. Its importance to teachers and geographers lies in the accurate and detailed survey of every aspect of life in this Chinese city. There are chapters on history, geography, government, population, health, education, commercial life, each illustrated by maps, diagrams, and photographs, and each full of detailed statistical information. In addition there are 116 pages of appendices giving tables of every description, the first being meteorological tables for 1918 and 1919, giving monthly statistics of pressure; maximum and minimum, as well as average temperature; number of inches of rainfall; days of rain; direction of winds; velocity of winds; average humidity, etc. These have been translated from Vol. 4 Astronomical and Meteorological Magazine, Astronomical Society of China. The tables in the appendix on Commercial Life, and the various lists of occupations in special districts will interest the student of economic geography. The thoughtful reader will inevitably contrast the high hopes of the writers as to the effect of introducing western civilization with the poor achievements in our own land, for a similar study of any of our great cities would certainly show an equal amount of poverty and vice and need for social reform. The chapter on " My nearest neighbours " would be just as depressing if a poor Chinese immigrant were to write of his European neighbours in the crowded quarters of any of our great cities. In writing of other peoples it is important to maintain a balanced mind, and to set forth both the good and the bad without risking the conveying of an idea of greater degradation in another land than in our own, when the facts cited could be matched and surpassed amongst us with such unfortunate facility.

Les Indo-Européens. Albert Carnoy. Collection Louvain. Vromant, Bruxelles, 1921. pp. 256. 18.5 x 12.5 cm. 7 francs.

Louvain is reasserting its ancient vigour by issuing books giving syntheses of research in a form interesting to the reading public. The present work is sufficiently well informed in linguistics to discuss Tokharian and Hittite for example, and to urge that the latter is a hybrid language. On the archæological side the author's reading is obviously less careful and fresh. He supports the thesis that the Indo-European languages spread from what are now the steppes of S. Russia, north of the Black Sea, and that they were carried about Western Europe to a large extent by broadheads. He however guards himself by saying that there had been broadheads in central and western Europe ages earlier, meaning thereby apparently the broadheads of the mountain zone from the French Central Plateau, through the Alps to Asia Minor. Incidentally he upholds the view that Albanians are not autochthones on the west side of the peninsula, but rather invaders from Thrace. Much is made of the pre-Indo-European basis of life in the Mediterranean lands, the " Celtic fringe," and North-west Europe. It will thus be seen that we have here a re-setting of a famous old controversy, which had lain dormant for some time. The survey of Indo-European language-families is not so well done as in Meillet's works, to which the student should have recourse. The author goes on to discuss the characters of the Indo-European cradle-land, as judged from the common roots of words, the domestic animals (sheep, goats, oxen, horses, dogs, and pigs), the cultivated plants (barley, millet, wheat), villages and towns, vessels and food, arms, clothing, commerce, weights and measures, social scheme, law, beliefs and ceremonies, and methods of transport. Altogether an interesting furbishing of an old story more or less brought up to date. The reader should study Feist (Indogermanen und Germanen, Halle, 1914) along with this little book.

A SHORT CRUISE IN THE SOUTH SEAS.

AUGUST 21st to SEPTEMBER 11th.

By Miss C. H. Sparling.

THE Navua left Auckland with a varied collection of passengers; the pigs and fowls had taken up their quarters in the forward deck before our arrival, but the sheep, massed in a solid circle, ever moving, never breaking, seemed determined not to leave the security of the wharf. At last one poor victim was seized by two men, and dragged, inch by inch, still struggling, over the narrow gangway; the others, with a few exceptions, being ready to follow.

Five days' sail brought us to the beautiful harbour at Suva (on Viti Levu, Fiji., long. 178 deg. 30 min. E., lat. 18 deg. S..) a great bay, nearly surrounded by volcanic mountains, their lower slopes brilliantly green in the early morning sunlight, their summits lost among the clouds.

The town, beginning on the flat and straggling up the hillside, is most picturesque. Chattering, laughing Fijians form attractive groups—the men tall, and with their beautifully moulded bronze bodies not over-clad—a shirt, perhaps, and a kind of kilt reaching to the knee, completing their costume; the women in long, loose garments, hanging straight from the shoulder; near by a Chinaman may be passing, with vegetables suspended in huge baskets from a yoke on his shoulder. Little parties of dark-eyed Indian women walk gravely along, clad in long trailing garments of orange, red, yellow or pink, and adorned with anklets, bracelets, necklaces, ear-rings and nose-rings; beside them are their little girls, dressed like their mothers in miniature, and extraordinarily beautiful.

From a ridge above the town, on the road to Tamavau Village, one can see the harbour, silver grey, far below. Beyond, the misty blue mountains are still cloud-capped, but at their feet a few red-roofed houses appear, half hidden among the palms. In the foreground winds the Tamavau River, separated from the harbour by a mangrove swamp of vivid green, while on its near side a coconut palm rises gracefully, overtopping banana and bread-fruit trees.

The wharf presents a busy scene on our return. Here are Fijian women, seated on the ground with baskets and mats of all shapes and sizes, tapa cloth,[1] tortoiseshell combs and rings, and local pottery for sale;[2] children haunt one with seed necklaces, red, white and brown; boys are showing tiny model catamarans,[3] while men display great pieces of coral, some purest white, some dyed blue, paper-knives and clubs made from Fijian wood.

We embark from Suva with sixty Fijian wharf labourers, who come round to our various ports of call. The Samoan men will not work at all, they say, and the Tongans demand twelve shillings a day, but the Fijians work for three shillings a day and their food. On Sunday nights they sit cross-legged at the top of the hold, singing hymns—English tunes, transformed with Fijian harmonies and Fijian words. After the hymn-singing comes the kava drinking. First of all the root is grated into powder, then strained with water through a cloth into a great kava bowl, twelve or fourteen inches across, and standing on a circle of tiny legs. Two of the chief Fijians then bring up the bowl, and offer the kava to the passengers in a half coconut shell, ground down and polished; the ones down below meanwhile give shouts of satisfaction as each newcomer is initiated.

Between Suva and Apia one passes near two islands belonging to the Tongan group. The first is an emerald, set in a lagoon of opal, and, beyond the reef, surrounded by a sapphire sea; the second, Niaufou, is volcanic in formation, and is thickly wooded with coconut palms to its very summit. Here, among many natives, dwell two white men, and a novel system of mail delivery has been instituted. As the ship draws near, she slows down, and a native swims out holding an oar, to which is attached his mail packet. This he drops into a bucket lowered over the side of the ship. A large tin box, strongly roped, and containing mail and meat for the white men and something else for the natives, is then thrown overboard. The native catches it by the rope and swims back with it.

Samoa's steep, forested slopes are the next to greet us. We sail for some distance with Savaii on the port side and Upolu to starboard. Apia seems to consist of one long street along the sea front, at one end of which is a bridge over the Vaisingana River, which comes down from Vailima, and whose fresh water makes the break in the reef by which one enters the harbour. Beyond here one comes to the native houses—neat little dwellings, thatched with palm leaves, many of them consisting merely of roofs suported by posts. Coming back towards the coast after a spin inland, we had our first experience of a tropical storm. The sky, which had been blue a few minutes before, was now grey, the sea a livid green. We turned and sped back into the town, but in a few minutes the rain was coming down almost in sheets, and continued to do so for about twenty minutes, after which the sun came out again. We set off once more along the quickly drying roads, and passed by a mangrove swamp—more stagnant and repellent than those of Fiji—through groves of coconut trees and clearings occupied by native houses, with neat little plots of taro, looking like clumps of arum lily, set out in front of them.

Our return to the ship was rather hindered by a quarrel between two sets of Samoan boamen, who each wanted to secure all the passengers. The two boats were alternately dragged to the landing place or pushed away from it by the friends or enemies of the rival factions. In the meantime the swift darkness of the tropics was coming on, and another storm was brewing. Before our boat was halfway to the ship the rain was coming in torrents—the wind, dead against us, seemed suddenly to turn cold. The Navua, which out at sea seems so much at the mercy of the waves, looked very solid and secure in comparison with our frail craft. Our boatmen, perhaps penitent for the delay, pulled like Britons, and we were soon scrambling thankfully up the gangway.

Two days later we came to Vavua, whose sapphire blue waters are hemmed in by dozens of coral islands. It reminds one of Queen Charlotte Sound, but the colouring is more vivid, the land for the most part lower, and the beaches are fringed with coconut palms. Neiafu, the little port, is interesting as soon as one comes to the native village. As we approached, the whole place echoed with the sound of tapping, which we presently discovered was produced by the makers of tapa cloth. We entered the palm thatched hut of one old lady, who was seated cross legged on the floor before a tree-trunk, on which she was beating out the strips of fibre with a wooden mallet. In a large open grassy space between the groups of huts, was a finished piece, about fifty feet long by twenty or thirty feet wide, stretched out in the sun to dry. In one of the other islands later we saw the men painting on the patterns.

A walk through plantations of taro, coconut, oranges, bananas, and breadfruit, and a scramble through the bush, brings one to the summit of a high hill, from which one can see the whole panorama of the Sound—

emerald islands, golden beaches, water like opal inshore and deepening to every imaginable shade of blue, and far out to sea the white line of the distant breakers.

An hour's run up the Sound in one of the ship's boats, towed by motor-launch, brought us to the Swallow Cave. We passed out of the hot afternoon sunshine into fairyland, a fitting site for the Sea King's palace. The dome-shaped roof must be about forty feet above the water, through whose depths of clearest blue one can see right to the bottom, which is like an inverted dome. The walls are soft shades of blue, jade, pink and yellow, and formed into shapes of amazing beauty. The water is the most wonderful blue—almost like flame—and imparts its colour to the innumerable fish that are swimming about. No artificial light is needed—the daylight streaming through the narrow entrance by which the boats sail in seems to be reflected into its farthest recesses. As we sail out we can see the living coral on the sea-floor at the cave's threshold.

It is interesting to watch the native Tongan passengers coming on board at night, while the Fijians are still busy loading. Their luggage consists chiefly of large mats with gaily coloured woollen fringes. One father comes up the gangway shouldering a huge wooden chest, his small son at his heels shouldering its minute replica. The entire poulation of Neiafu seems to be on the wharf as the time for departure draws near, and it is difficult to distinguish between those who are really going and those who are only seeing others off. Many of them wear garlands of flowers, about a foot deep, hanging from the waist downwards.

Haapai, which we reached by sunrise next morning, is a typical coral island, with golden sands and a forest of coconut palms. Most of the huts are good native work, the walls being covered by a kind of matting woven to form patterns, and the roofs being thatched with palm leaves, but here and there one sees native-made walls surmounted by horrible corrugated iron, or corrugated iron walls beneath a thatched roof. The white people, of whom there are only thirty, live in ordinary bungalows.

Nukualofa (Land of Love), which is our next stop, is more imposing. A long pier has been built out from the shore to the tiny wharf. Deep water comes suddenly, for at low tide there seemed to be less than a foot of water within a yard or so of the ship. The Royal Palace can be seen through the trees that line the sea-front—coconuts and pines rather like the Norfolk Island variety. On closer inspection one can see the royal hens scratching on the royal lawns and preparing to fly on to the royal verandah!

On the far side of the island are the famous blow-holes, where water from the breakers is forced up through gaps in the coral ledges to a height, sometimes, of fifty feet. Along an overgrown, rutty road, we come to a native village sacred to flying foxes. These are really a species of large bat, with a yellow and brown body, that suggests a Teddy bear, and the mothers carry the young in a kind of pouch. There must have been literally thousands of them there, some flying round uttering queer, hoarse cries, and others clinging to the trees, from which they have moved every trace of vegetation.

After so many strange ports it seems almost homelike to get back to Suva, where we visit again the cafe with this notice in large letters beneath the clock:—

"In God we trust.
All others pay cash."

We spend a night beneath mosquito-curtains at the Grand Pacific, where we are waited on by bare-footed Hindus with white uniforms and gaily-coloured sashes; a morning investigating some of the queer shops in the native part of the town. In one an Indian jeweller is at work hammering out long pieces of gold before a tiny anvil, while another man is making curry over a very small fire; in another, which we enter in search of kava root, the proprietor is playing draughts with a customer on a board cut from a piece of wood about an inch thick. We stand and watch—the game goes on. By and by a few more customers come in, but we all wait until the game is finished.

There are no native-built huts in Suva itself, except for a special one within the Government House grounds, but Solomon Town and Tamavau village may be reached by motor. The Fijian houses have a distinctive ridge pole, but the walls are made with the ends of the palm leaves hanging down. It probably helps the heavy rain to run off instead of saturating the walls, but it gives the houses an untidy appearance, very different from the neatly woven patterns of Samoa and Tonga.

Rain prevented our taking a launch trip inland up the Rewa river, and also from going over to the reef at low tide.

Some Statistics of Rainfall in Suva (taken from a local newspaper) :—

	1922. Inches.	1921. Inches.	Average Inches.
January	25.14	20.49	10.36
February	16.12	11.38	10.14
March	29.52	17.20	14.69
April	12.41	27.02	12.32
May	8.42	8.86	9.99
June		4.93	6.10
July		4.85	4.24
August		11.30	10.28
September		10.03	8.04
October		4.91	7.41
November		20.27	9.79
December		29.40	12.73

NOTES.

[1] Tapa or Bark Cloth. This is made by stripping bark from branches and roots of some young trees (especially the paper-mulberry, Morus papyrifera, in Polynesia). The strings of bark are then soaked in water and the inner bark stripped off by a sharp edged instrument (a shell in Polynesia). The strips are next placed in rows, piled about three deep, and pressed for a day or so, by which time they have usually adhered to one another. They are then hammered and felted together, being kept wet the while. Decoration is often bold and fine, and may be painted freehand or set on with a stamp or a frame. Finally, the surface is oiled or otherwise protected from damp, which would rot the material. Sheets of Tapa are gummed or sewn together when necessary. The art is an old one. It has been superseded by weaving in many parts of Asia, Africa, and America, but it occurs among many lowly tropical nature folk, including several who are, in physical type, survivors of ancient long-headed stocks. Most of the pigmy peoples are said not to make Tapa. The Veddah, Sakai, Semang, many lowly Indonesians, the Papuans, Melanesians, and Polynesians, a few groups in tropical Africa and in S.E. and W. Madagascar, and a few in the interior of Brazil, use it, and the Australians make bark belts. The art has been carried to a high level by the high grade peoples of Polynesia, the only high grade people who retain it, and did not weave before Europeans reached them. It is noteworthy that the Maori do not make Tapa, but weave flax. Weaving is known in Santa Cruz (Solomon Islands), and may once have been known elsewhere in Melanesia at least.

[2] Pottery is rare in Oceania, none is known from Polynesia, but it is characteristic of parts of New Guinea, New Caledonia, New Hebrides,(Admiralty Isles and Fiji. The Fijian pottery is usually reckoned the best. The forms of vessels are peculiar, being often combinations of vessels side by side, thus providing stability without flat bottoms. The ornament is usually simple and in spots and lines; the surface has a

vegetable varnish. The absence of native pottery from New Zealand is very remarkable, but we cannot know whether here and in parts of Polynesia it may not be a forgotten art. Fragments of old time pottery in S.E. New Guinea are said to be of better quality than any made at present.

[3] Catamaran. Typically a surf-boat formed by lashing together three tree trunks side by side, the middle one being longer than the others.

Readers who are interested in the arts and crafts of the world's peoples are strongly advised to get the Handbook to the Ethnographical Collections of the British Museum. They will also find useful the Guide Book to the Collections illustrating the Races of Mankind (British Museum Natural History).

Teachers who wish to make the South Seas interesting to their older pupils should read widely in the works of Robert Louis Stevenson, and they will find the voyages of Captain Cook a most profitable study.

THE VISUAL INSTRUCTION COMMITTEE OF THE ROYAL COLONIAL INSTITUTE.

The work of the above committee should be known to all teachers of geography, as its aim is to provide, through the medium of lantern lectures, the means of giving as vivid and accurate knowledge as possible of the geography, social life and economic possibilities of the component parts of the British Empire. The plan followed is to make a careful selection of typical and recent photographs, chosen to present as complete a picture as possible, and then to write a series of full expalnatory notes on the slides rather than a set lecture. The lantern slides number some 60 in each lecture. The slides are sold for the Committee by Messrs. Newton. Prices, subject to revision, are 2/- for plain slides, 3/6 for maps, 6/6 upwards for coloured slides. Messrs Newton also lend them out in sets at the rate of 5/- per set. Illustrated books containing the original full length lectures on India, The Sea Road to the East, Australasia, Canada and Newfoundland, South Africa, West Indies and Guiana, with marginal references to the numbers of the appropriate slides, are published by Messrs. Geo. Philip, 32, Fleet Street, E.C.4, price 1/6 each. Pamphlets containing the shorter notes are issued at 6d. each, as follows: Hints for Lectures on India, on South Africa, on Canada, on Australia, and on London, the Heart of the British Empire, and may be obtained either from Messrs. Newton, 72, Wigmore Street, W.C.1, or the Royal Colonial Institute, Northumberland Avenue, W.C.2, or the Visual Instruction Committee.

CORRESPONDENCE.

SURVEY OF ENGLISH PLACE-NAMES.

Sir,—Through the kind activities of members of the Geographical Association and of a few other friends also, considerable progress has been made with the construction of the Gazetteers of place-names which form so essential a basis of the work of the Survey. Special mention may be made of Gazetteers of the place-names of the East Riding and of Cornwall, recently completed by Miss Wellington, of Launceston, and Mr. W. Myers, of North Newbald. Other counties have been completed or are in process of completion, but many counties are still untouched, and on behalf of the Survey I would appeal very earnestly for more help in this direction, not only from individual members, but also from branches as a whole. Those who are working upon the historical documents are finding these Gazetteers invaluable in the work of rendering identification much more sure and rapid than it would otherwise be.

Instructions for the compilation of these Gazetteers have now been printed, and can be had on application.—Yours faithfully,

Allen Mawer.

The University of Liverpool.

MADAGASCAR.

LA VEGETATION MALGACHE. E. PERRIER de la BATHIE.

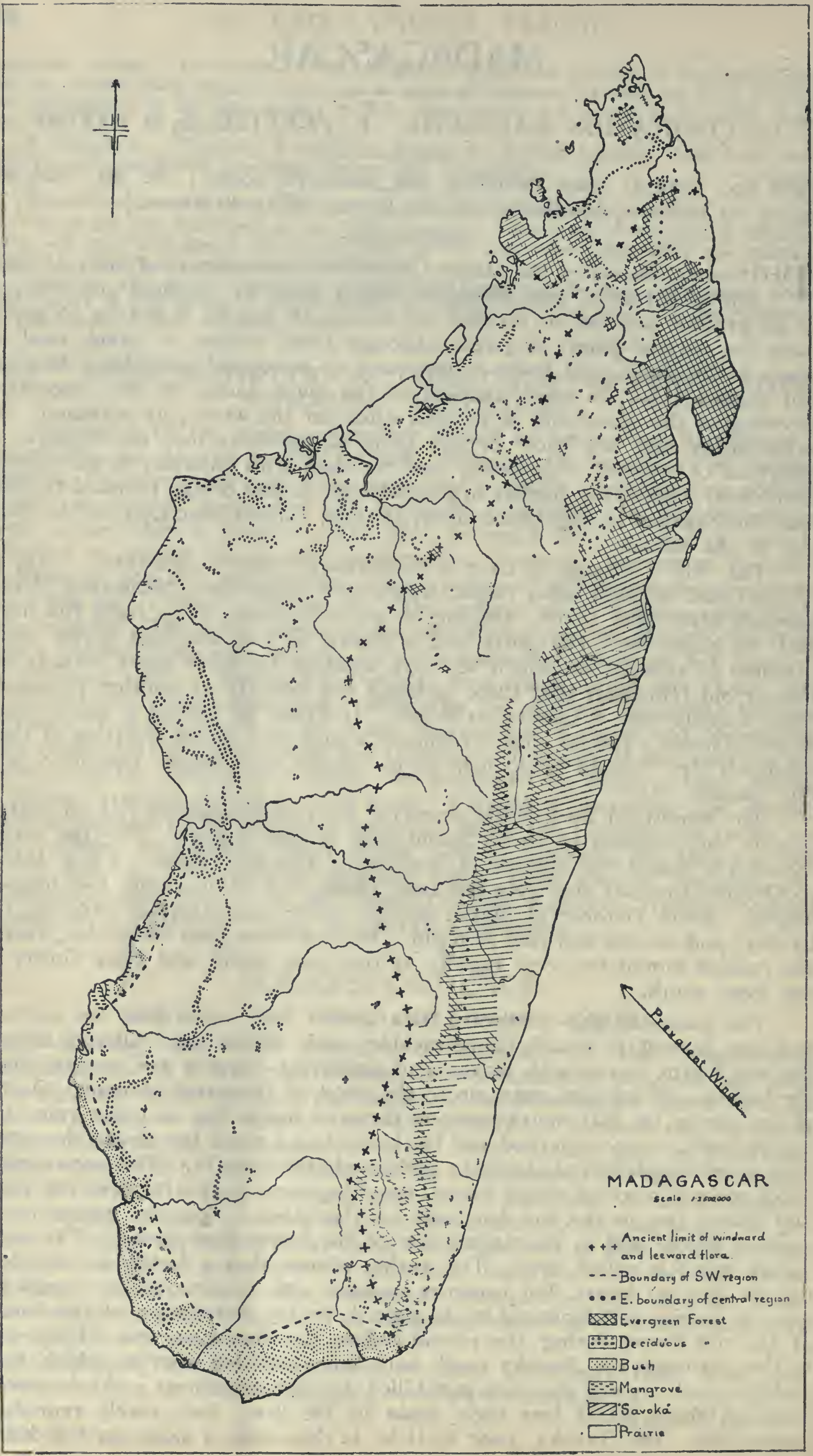
[268 pp., several maps including one (coloured) folder; 25 by 16.5cm., Paris, Challamel, 17 rue Jacob; 1921; 40 francs.]

THIS work, issued by the Musée Colonial de Marseille, is of unusual value and importance, and should be widely used by teachers and students of geography, whether or no they are sufficiently versed in botany to appreciate the lists of plants it gives. Though these occupy a good deal of space in the book, and make it important to biological specialists, they are not necessary for an understanding of the main facts of the vegetative covering of the island and of its alteration, for the worse, by mankind. No other study that we know of has gone so carefully into the changes in progress of tropical vegetation, and we note with interest, if not always with ready assent, the further arguments the author brings forward to show that the changes in vegetation have, in turn, further reactions on the plant life of the island.

The island is said to have a "windward" and a "leeward" flora, on its east and its west sides respectively; save that the "windward flora" spreads across the island, keeping at some distance away from the north end, to Nossi Bé. The north end is shown as less wet and herein lies a problem of climate, of which teachers need to be made more aware; one cannot but remember that there is much dry country at another projecting nose, namely that in north-east Brazil. It would be helpful if some reader who has made a special study of climate would take up the question of these relatively dry "noses," and help us to discuss them more reasonably with our classes.

The windward flora in its primeval state is singularly rich in species and in the numbers of forms found only in this region. For the rest it includes a number of species of Asiatic or Oceanic origin. From March to October the east side gets fine rain, cloud, and often rather low temperatures. From October to March on the other hand there is brilliant sun by day, and storms and rain at night. Maraontsetra gets most rain, thence the rainfall diminishes very rapidly as one goes north and more slowly as one goes south.

The plants of this windward flora spread their roots near the surface, and the subsoil is usually impermeable, and, before man altered things, the wet warm forest with leaves and epiphytes covered the country from the lagoons of the east coast up to the edge of the great plateau. On the slopes above the 800 metre contour there is much fog and fine rain, but dry periods are more marked and the forest has a more temperate character, with some tough-leaved plants to withstand the drought. The native cultivator seeks a piece of virgin forest, roughly clears his patch, fires the wood and plants rice in the soil fertilised by the ashes. Soon he moves on to another patch, and so the destruction of the forest goes apace. The cultivation patch is called tavy. The author shows that a forsaken tavy does not go back to forest, but becomes covered with brushwood or "savoka," poor in species and hindered in its growth by the denudation of the humus of the old forest during the period before the Savoka grew. Fires still further damage the Savoka until only those species survive which have underground organs that are not killed by this treatment. As however, many of these plants lose their seeds in the fires, they rarely reproduce themselves. The Savoka, poor as it is, is thus only a stage on the down-


Prevalent Winds
MADAGASCAR
Scale 1:3500000
+ + + Ancient limit of windward and leeward flora.
- - - Boundary of S W region
• • • E. boundary of central region
▩ Evergreen Forest
▦ Deciduous "
▤ Bush
▤ Mangrove
▨ Savoka
☐ Prairie

Adapted, with grateful acknowledgements, from the large map issued grade to the "prairie" now covering immense areas in Madagascar both to windward and to leeward. It is often afire, and only some tough species manage to survive; they are poor cattle-food because of their toughness, and many of the plants are cosmopolitan nuisances. The primeval forest of the windward side is a plant association in delicate equilibrium, and there are few groups of similar plants in it, i.e., the diversity in every part is very great; also no alien plant seems able to get a foothold in it. It is evidently the result of a very long process of evolution in situ. It has a dense crown of varying height with evergreen leaves, and thick undergrowth including herbaceous plants. Mosses, ferns, orchids, and epiphytes generally, as well as lianes, are very abundant, while erophytes are rare.

The epiphytes often have a funnel arrangement of their leafage, in order, it would appear, to catch falling leaves from the trees, and to use the humus from those leaves.

At a certain height (800 metres) climbing bamboos become commoner, leaves get smaller, the undergrowth thickens. After a further rise, violet and ranunculus appear and we leave the "windward" flora. On the peaks the trees are naturally gnarled and low.

The forest on the leeward side has the crown more discontinuous and includes many bushes. Its leaves are shed in the dry season and there is little undergrowth. Mosses, ferns, and orchids are comparatively rare as are all epiphytes. There are many xerophytes. Thanks to the system of fires some fan-leaved palms with special resistance have spread in the west, but they belong to the "altered flora."

The author claims that, in the windward forest, seeds innumerable lie in wait in the humus until the fall of some giant tree gives them the light needed for germination, or in other cases for growth. A tree is therefore but rarely replaced by one of its own kind. The regeneration of the forest where a giant has fallen may take 15-30 years; we may repeat that it does not regrow after a tavy.

He thinks that the prime factor of laterite formation, so widespread as a soil-element in the tropics, is the reactions from decomposed vegetation, especially forest humus. Under humus laterite remains soft and permeable, so that denudation is very slow. But if forest gives way to savoka, and savoka to prairie burnt each year, the soil feels the direct sunshine more and more, and the laterite may harden into an impermeable iron-crust, useless for plants, so the last state of the land may be sheer desert. The descriptions of all the chief variants of each flora, of the efforts of the French to grow crops, and of plans to suppress the tavy and the fires, and many more points are of great interest in this book, which we must now leave with a repetition of our recommendation of it to all serious students.

Les Régions Géographiques de la France. E. de Martonne. Paris, Flammarion, 1922. 191 pp., 19 x 12 cm. 15 figures.

The famous Tableau de la Géographie de la France is a work for the school library and the teacher's private collection, but this little book, inspired by Vidal de la Blache and written by his son-in-law, should penetrate to whole classes of geography students and school pupils. We hope it will be bought far and wide, and the Association's Central Office will be glad to send replies to queries (enclosing prepaid and addressed envelopes) as to ways and means of procuring French books if difficulties are found.

The little book gives a simple and attractive account of France and its people region by region, emphasising the relation of geology, soils, cultivations and settlement. The pupil who is studying French literature will profit greatly by following the account of the sunny land with an atlas, and the book offers a splendid opportunity for the teachers of French and of Geography to co-operate to mutual advantage. We must try to see that every pupil who does Geography in the higher forms of a secondary school gains a decent knowledge of geographical writings in a language other than his own; this book gives a fine opportunity to experiment in this direction.

REVIEWS.

The Place-Names of Lancashire. By Eilert Ekwall, Ph.D., Professor of English in the University of Lund. (Publications of the University of Manchester, 1922).

This book is worthy to rank with the best of those works on the place-names of English Counties which have appeared in the last twenty years; and it should be read by anyone who is interested either in place-names and their philology, or in Lancashire, or in the early history of England. On all these subjects it throws new light. The author is obviously a skilled philologist. But he is also acquainted with the freakish tricks which popular imagination, that *enfant terrible* of the philological nursery, will play with philological law, and therefore is able to avoid errors into which many a more unimaginative philologist would have fallen by applying, or attempting to apply, the laws of sound evolution in cases in which the modern name has been due to some analogy of form or meaning which has happened to strike the popular fancy. He has also followed that most important dictum laid down by Professor Mawer, to the effect that the enquirer into the origins of such names must make himself, either by autopsy or by the use of large-scale maps, acquainted with the topography of the region in which the names occur.

The first impression which such a book makes upon a reviewer is that the author knows far more of his subject than any critic can know. The present writer cannot criticise the Celtic and Norse elements in this particular work. All that he can say of them is that, to one who has a little knowledge of those elements, Professor Ekwall's conclusions seem sound, and carry conviction with them. With the Anglian element the case is different; and to one who knows the place-names, and above all the Saxon charters of the south of England, the meanings which the author attaches to certain Anglo-Saxon terms is puzzling and somewhat startling. But the critic is not on firm ground even here, since it is quite possible that terms used in a certain sense in the Saxon south may not have been used in the same sense in the Anglian north .

It may be convenient to those readers of this journal who happen to study this book to know where the views expressed in it as to the meanings of terms seem strange to one whose acquaintance, so far as it is based on original enquiry, is limited to place-names and charters of southern England. Most of these terms occur in the vocabulary of the elements of Lancashire names given on pp. 7ff. of the book.

" Cultivated field " as an interpretation of " aecer " is not incorrect; but it is very misleading if the evidence of the charters counts for anything. There it is always used of a strip of plough-land, i.e., of a piece of arable land which had roughly a breadth of 22 and a length of 220 yards; and to these dimensions the " accer " approximates sufficiently for it to be used in surveys as a measure of length and breadth. A boundary will be described, for instance, as going " then west one aecer broad," which means that it ran west for about 22 yeards, or the breadth of an aecer. " Aern " may be translated " house." But so may " ham." " Aern " is really a building used as a storehouse or factory. " Baec " is possibly a " back," or, topographically, a " ridge," and in the dialectic form "batch" is still applied, in Somerset at any rate, to ridges of land. But there is a word reported to be " baec," which means a " streamlet running in rainy weather." Its use in this sense in the Hampshire charters is clearly demonstrable and frequent. In the charters " beorh " is almost always, perhaps always, used of a barrow or tumulus. There are one or two instances in which it may mean " hill "; but they are uncertain.

" Feld " in the charters means " open land," never " field " in any modern connotation of that term. Perhaps the old meaning of it survived in that term " common field," which has almost passed away from our maps since the time of the Enclosure Acts. " Haga " is used in the charters of a deer fence, and probably of the area, mostly woodland, enclosed in it. But there is no reason to suppose that it acquired the meaning " homestead "—in the south at any rate.

" Halh " is treated in this book as parallel in meaning with the Mercian " haugh." The Saxon " healh " meant a small hollow in the side of a slope. Its application to river lands in later times is accidental,—due to the fact that such hollows were naturally common in the sides of river valleys. Its southern derivative " hale " is sometimes applied to lands far away from any river or stream.

" Hlaw " or " hlaew " is common in the southern charters, and is, as far as can be seen, always used of a tumulus, never of a hill. But here the usage of the north may have been different. " Hyrst " is always a " wood," never a " hill " in the southern charters.

But it is impossible in a review to cite all the instances in which the evidence of the southern charters leads to conclusions as to meaning which differ from those given in this book. In the charters, for instance, the meanings of " lacu," " land," " leah," " maere " or " gemaere," " mere," " mor," " pol " or " pyll," " scir," " stede," " wic," and " worth," are either different from, or, in most cases, more specific than those given in this work. But there is always the possibility that the meaning in the north may have differed from that in the south, and, consequently, that the author may be right and the critic wrong,—as far as Lancashire place-names are concerned.

But that the charters have to be reckoned with by those who would interpret place-names is undoubtedly the case. Any further suggestions must be mere jottings.

P. 33. Strangeways. " (Ge)waesc " in topography is very often a sheepwashing place. P. 69. Samlesbury. Semley, Wilts, seems to derive its name from the River Sem. P. 92. Gambleside. " Heafod " is never a " hill " in the charters. It is the " head " of anything,—of a valley, etc., etc., or the headland of arable ground. P. 96. Poulton. " Pol " or " pyll " in the south is not a stream; but, as meaning a " pool," is always applied to a pool in a river or stream, and not to any other kind of pool. P. 129. Heath Charnock. The river Ock in Berks is AS. Occene, Eoccene. The Cern is quite a different stream. P. 129. Coppull. Surely a " Copped Hyll " would be one without, not with a peak,—one with the appearance of having had its top cut off. Cf. " copped," applied to trees,—" pollarded." P. 133. Copthurst, " Pollarded Wood." See previous note. P. 172. Lentworth. " Lenta " also occurred in Saxon times as a stream name in Wilts. P. 202. Billingcote. " Billinge " looks suspiciously like a brook name of the same type as " Wanetinge " (Wantage), " Lakinge," (Lockinge), and " Gaginge " (Ginge) in Berks.

But anyone who realises the learning and ability displayed in this book may look on this as somewhat carping criticism. Still it does point the moral that we shall have to know the vocabulary of the Saxon charters, a vocabulary in which the dictionaries give little assistance, before we can attain to satisfactory accuracy in the interpretation of place-names.

G. B. Grundy, Oxford.

The Hill Tribes of Fiji. A. B. Brewster. 23 x 14 cm. pp. 302 + index, illustrations and folder map. Seeley, Service 1922. 21/-.

The author writes with an intimate knowledge, gained from forty years' residence, of the native hill tribes of Fiji. Though they were cannibals, Mr. Brewster's sympathetic insight into native psychology makes us appreciate that this does not mean either that they were unintelligent or that they had not a high standard of morality on some other points. His racy narrative is full of practical illustrations and anecdotes which show us how custom works out in daily life, and how social and physical environment mutually interact. A most interesting and suggestive chapter is that giving the possibilities of settlement of Fiji by natives from the congested districts of the Deccan. The reviewer is glad to notice the author's reverent appreciation of Sir Everard im Thurn, who has done so much for higher standards in the relations between European and non-European populations.

The Worst Journey in the World. Antarctic, 1910-1913. Apsley Cherry Garrard. 2 vols. Constable. 1922. 63s.

Mr. Cherry Garrard was assistant zoologist to the Scott Antarctic Expedition, 1910-13, was one of the three men who made the terrible journey in winter darkness to Cape Crozier in search of information about the Emperor penguin, was one of the first returning party on the Polar journey, and was with the search party that found the tent in which lay the bodies of Scott, Wilson and Bowers. It is therefore clear that he is in possession of an experience which should qualify him to tell a thrilling story, and his distinctive and breezy personality and vivid way of setting forth what he and his companions saw and suffered and achieved, make the book as fascinating from the human point of view as it is interesting and useful on the scientific side. It is a book which should be accessible for scholars in the upper forms of every secondary school, for it is such epics of travel and hardship and endurance that give a vivid reality to the geography lesson, and bring home the varied and cumulative chain of consequences following on different climatic conditions. Anthropologists will read with special interest the chapters dealing with the Emperor penguin, for the intense development of the maternal instinct and the prolongation of the period of dependence of the offspring upon its parent in that frozen and difficult region seem to support the theory that the development of human maternal care, with consequent increase of opportunity for fuller expansion of the child's powers, may have received a great impetus when cold settled on Europe. There are also other interesting records for the student of the effect of climate on physique. The book contains a good deal of material not published before,extracts from his own diary and from those of Wilson and Bowers and Lashly. It also discusses in a spirit of sane scientific enquiry the causes of the failure of the five who made the Polar journey, and attempts to point out to future explorers what may be learnt from the experiences which they and the others of Scott's party underwent. Much practical, detailed information is given as to the relation between diet and climate and work, the methods of transport, the best way of storing oil and rations, the pitching of tents, the value of freshness as a physical asset, both for men and dogs and horses, for in that region of appalling difficulty the vital energy is soon sapped and worn out even though the spirit may remain undaunted, and so not recognise the failing of the physical side in time to avoid disaster. Messrs. Constable are to be congratulated on the very beautiful way in which the book is illustrated, and Wilson's colour sketches add beauty to the illustrations, as his personality adds charm to this vivid and intimate narrative of heroic effort for scientific and abstract ideals.

The Direction of Human Evolution. E. G. Conklin. Oxford Univ. Press, 1922. xiv x 247 pp. 21 x 14.5 cm. 12/6.

This interesting essay is not geographical, as the title might suggest, but problems of evolution are of general interest, and it is important to note the work of a biologist who at least avoids a too distressing crudity in applying biological ideas to humanity. We have suffered much from a view of nature as a ceaseless conflict of egoisms, and Prof. Conklin rises far above this. He is inclined to take Malthus without the necessary grain of salt, and should study Mr. Carr-Saunders on Population, and he gives the same acceptance to the fashionable " mental tests."

His attitude in race questions is interesting. He foresees blending of all races into a common stream, a view which surely ignores the relation of race character to fitness for climate zones, and also under-estimates the large amount of mingling in the past.

He is a good American democrat, and claims for democracy a sensitiveness that leads to adaptation and so to fitness. He wants democracy modified by race segregation under conditions of mutual respect. His argument on evolution and religion is well written, but addressed to convince people who no longer exist in scientific circles in this country. One hopes that those who read Conklin will go on to Prof. J. Arthur Thomson's deeper study of " The System of Animate Nature."

The Evolution of Climate. C. E. P. Brooks, with a preface by G. C. Simpson, F.R.S. London, Benn Bros., 1922. 173 pp., 22.5 x 14.5 cm. 8/6.

The preface by the Director of the Meteorological office bears a well deserved testimony to Mr. Brooks' seriousness as a student of climates of the past, and emphasises the need that has long been felt for more precise statements about distribution of zones of climate like the warmth of eocene times and the cold of the Ice Age. This is a book of absorbing interest, and up to date to the extent of discussing the Wegener hypothesis as a possible explanation of some climatic changes in certain regions. As might be expected, the author prefers the view he has done so much in previous papers to develop, namely that the main factors of climatic changes are changes due to upheaval and subsidence. His summary of climatic conditions over a high ice sheet tells of the relatively dense air that keeps out the oceanic cyclones, so that snow, or rather ice, is received from mists where currents of the upper air come into contact with the high land. Granted a large ice sheet, the author points out that the thermal gradient between equator and poles is increased, air movements are made more powerful, and there is at such times increased snowfall on mountains near the equator though equatorial plains may remain warm. The last Ice Age (*sens. lat.*) is discussed for all parts of the world in nine chapters, and one may notice specially interesting views as to changes of conditions in the Sahara.

The oscillations of climate at the end of the Ice Age are sketched largely on the basis of de Geer's and W. B. Wright's work, coupled with the author's own meteorological analyses. He seems to equate the Bühl, Gschnitz and Daun pauses in the retreat of Alpine glaciation with the halts of the Scandinavian glaciation respectively on the Baltic shores of Germany, at the Fenno-Scandian moraines and at the Rogunda moraines. Several other students would prefer to relate the Gschnitz and Daun to the moraines at Rogunda, the Bühl to the Fenno Scandian and the double Würm to the Dani Glacial and the Gotiglacial of the Baltic shores. Mr. Brooks adduces evidence for a post-glacial submergence in northern latitudes, and has worked out isohalines (lines of equal saltness) from the distribution of the marine molluscs of that time. He thinks there is evidence of the great influence of maritime conditions about 4,000 B.C., and for a climatic optimism. Elevation followed to a certain extent, and bogs gave place to forests during a period with conditions rather like those " of 1921, with low pressure and stormy conditions in the Arctic Ocean, and a belt of high pressure and persistently fine weather across Central Europe." Subsidence in the north followed, and the author thinks present levels were reached about 1,800 B.C. With this he thinks the climate of W. Europe became more rainy and bogs replaced forests to some extent, the deterioration in Scandinavia being indicated by archæological data, especially about 650—400 B.C., a correlated increase of rainfall would have helped mankind in the Mediterranean area (1800 B.C.—500 A.D.)

Mr. Brooks discusses O. Petterson's hypothesis of cycles of tidal strength, and shows a good deal of sympathy with it, and also with Ellsworth Huntington's views on climatic pulsations. But this portion of the book is severely cut down, and looks like a skeleton of what we hope may be a future study from Mr. Brooks' pen. He has imagination as well as knowledge, and he has given us all a great deal to think about and something to criticise.

In his correlations of phases of the Ice Age with early phases of human culture, Mr. Brooks had to write without knowledge of the excavations at Cotencher in Switzerland (see Wiener Præhistoriche Zeitschrift, 1922). These make it almost certain that Neanderthal man (Mousterian culture) lived during the Würm Ice Age, and that the rise of modern man in Europe is therefore to be correlated with the intermittent better ment of climate accompanying the definitive, if discontinuous, retreat of the ice.

The Primitive Culture of India. Lectures delivered in 1922 at the School of Oriental Studies, Lond. Univ. Col. T. C. Hodson, Roy. Asiat. Soc. (74, Grosvenor St., W.) 15 x 25½ cm. pp. 133.

Any attempt to compress so vast a subject into so short a space must necessarily suffer seriously from the process of condensation, and in this case there is a certain kaleidoscopic effect about the rush from point to point and example to example that is decidedly tiring. But the book is a storehouse of valuable information, with copious bibliographical references for all statements quoted,—a most useful and desirable point in such a work. Students who wish to make serious use of the book will probably find it helpful to make a number of blank maps of the regions discussed, and to enter on them the various data as they read. The lack of any map or illustration is a decided drawback. In his introductory lecture, Colonel Hodson pays a tribute to the late Dr. Rivers, and undoubtedly any study of primitive cultures will mean much more to readers who are familiar with the sane psychology of the late President of the Royal Anthropological Institute.

Oxford Geographical Studies:—The Andover District. An Account of Sheet 283 of the One-Inch Ordnance Map. O. G. S. Crawford. Oxford University Press, 1922. 100pp., 15.5 x 16.5 em, 15 illustrations and 16 maps. 7/6 (paper covers).

This essay is work done by Mr. Crawford as a thesis for the Diploma in Geography at Oxford, when he was studying under Professor Herbertson in 1910. Prof. Herbertson's death delayed publication, and the period of war difficulties supervened. Now it has been partly revised by the author, who has become well-known in archæological circles.

There is some doubt as to the advisability of describing country divided into map-sheets, but that was the scheme in vogue in 1910, and Mr. Crawford had to follow it. As his study includes a good deal of research, it is well that he should have allowed it to appear in spite of this limitation.

The memoir discusses the physical aspects and then the economic aspects of the district, devoting to these the smaller half of the book. The larger half is taken up with appendices, some of which will be found valuable and suggestive by local researchers elsewhere. The appendix on the grouping of parishes is of special interest, and so is the geographical restoration of Anglo-Saxon Bounds. The place-names and their changes from early times are again noted with care. Several features of historical geography are thus discussed in a way which may well be utilised for other regions. Another feature of the author's work is that he tries not to make his book a series of specialist notes in geology, climatology, physiography, and so on; the facts are worked in, but he writes for the district all the time.

The Wirral Peninsula. W. Hewitt. Univ. Press, Liverpool (Hodder and Stoughton, London), 1922. pp. xii + 293. Two Folders (Speed's and Greenwood's Maps) and 10 other illustrations. 7/6.

The Geographical School of Liverpool University some years ago formed a Liverpool and District Regional Survey Association, with a Committee including teachers of every type, education authorities, scientific societies, social workers and others. The present volume is the produce of the work of this Association under the direction of the Association's skilled cartographer, Mr. Hewitt, and its quality will assure it a warm welcome from all who are interested in regional survey and local research for the interpretation of the evolution of human conditions and activities. The treatment follows an orthodox sequence dealing with land surface and geology, coast line, estuaries, the stream system, water supply, climate and weather, vegetation, animal life, prehistoric times, the historical record, towns and villages, population and local government, communications, agriculture, industries, schools, churches, and miscellaneous notes on customs and place names. Each section has a serious bibliography, and the whole work is thoroughly imbued with a scientific spirit.

The whole book is a careful collection of facts with due consideration of differing opinions, albeit here and there rather too little pronouncement of conclusions on disputed points. One would like to know, for example, whether the Regional Surveyors who have worked on the locality agree with Mr. Ashton's view, that sinking is going on and has been continuous for a long time, or with the more generally accepted opinion of the late Mr. Mellard Reade, that there has been no measurable vertical movement of the land since Roman times. One does gather that the existence of the Mersey estuary in Roman times is supported, but a stronger pronouncement would have been welcome. The historical record is a series of notes on the various evidences, and seems very useful; the accounts of individual villages are very attractive and valuable.

We hope that the Association will go on from this valuable notebook to similar notebooks of other regions around Liverpool, and will build upon them a living interpretation of the whole area in which the great seaport has arisen, and which it has altered so deeply.

The British Isles. W. H. Barker. 14 x 19 cm. 140 pp. Geographia. 2/6.

Teachers who are on the look out for a class book for young children just being introduced to the geography of our islands should certainly send for a copy of this little book. The preface and contents list are suggestive of one of the newer methods of presentation. The text is clearly and simply written, though here and there, as is inevitable in such books, the difficulty of compressing and " writing down " to a child's level is much in evidence, e.g., the quotation on p. 59 is undoubtedly strong intellectual meat for babes. There are several good maps, and the illustrations are of the beaten type. Suggestively enough, London has the Bank of England for its typical building, instead of the Houses of Parliament.

A Republic of Nations. R. C. Minor. Oxford Press. 12/6. English Edn.
The Society of Nations. T. J. Lawrence. Oxford Press. 10/-. ,,

Both these books were published in America in 1918 and 1919. The former is by a Professor of Constitutional and International Law in the University of Virginia, the latter by a Reader of International Law in the University of Bristol, so that in reading the two side by side one gets a most illuminating glimpse of the effect of the national point of view, even though the writers are both students of international relations. Mr. Minor considers carefully the present constitution of the United States, and outlines his suggestions for a constitution of the united nations of the world, and an appendix gives the full constitution of the United States in one column, and parallel with this in another column the proposed constitution of the united nations. Many readers will feel that the author is somewhat lacking in modesty when he claims that all white races are progressive and all coloured races backward. One wonders on what anthropological grounds the Japanese can be claimed as " white," while the Chinese are listed as " coloured." Mr. Lawrence attacks the problem from a very different standpoint, and discusses the progressive history of International Law and Relations in Europe, with an attempt to outline the philosophy underlying the construction and working of the law. He sees the future possibilities of world co-operation in terms of improved individual ideals and aspirations rather than in paper constitutions. Perhaps if his suggestion that all trade in munitions of war should be international, and not in private hands, could be put into action as a beginning, the remaining problems would prove more easy of solution. Certainly the student of human geography whose interests lean towards study of societies, will find much to reflect upon in these two books.

A Naturalist in the Great Lakes Region. Elliot R. Downing. University of Chicago Press (and Cambridge Univ. Press, London). 1922 (Second Impression). xxvi x 328 pp., 20 x 14 cm., 452 illustrations. About 12/-.

We in Britain may be too far from Chicago to appreciate some of the details of this work, but it has its great importance for us in that every teacher of geography is concerned with the problems of his neighbourhood and the interpretation of its phenomena, and this is a book for teachers that will help them in the search for good methods and a live point of view. The author sees everything not merely as " there " owing to certain circumstances, but as " becoming " what it previously was not. Whether he is studying structure, scenery, or vegetation, he keeps his eye open for the process of becoming, whereby nothing doth fade, but doth suffer change into something rich and strange. Of the topics discussed, one which will be welcomed by British teachers is the summary of the postglacial changes which have brought the Great Lakes to their present extent and condition. The summary seems well done, and is based mainly on Leverett and Taylor. It is a pity that a selected bibliography for this section is not given. The geological description includes a convenient list, helping the stranger to place the locally named formations in their proper places in the generally accepted classification, but the physiographical part seems a little weak at times. A curious arrangement is that the chapter on glacial deposits, after speaking of the various rocks occurring as boulders in the moraines, suddenly becomes a chapter that gives a sort of introduction to petrology. This is, however, a trifling error of arrangement.

The survey of vegetation and the vegetation and species limit maps of the eastern half of the U.S.A. should be studied. They suggest several improvements on our currently accepted vegetation maps, and for comparison with the vegetation map is given a map that marks the ratio of rainfall to evaporation. This map appears to be tentative, but its relation to others one could make is most suggestive, as is also the map of tree-limits for beech, hickory, oak, tulip, walnut, and locust. An interesting paragraph gives the author's view of the succession of vegetation, starting from base dunes. " On the dunes cottonwoods and their confrères are replaced by the pine association. This is in turn invaded and ultimately displaced by the black oak society. After . . . accumulated forest debris . . . red oaks, then white oaks, and the mixed oak succession follows with its associated shrubs and herbs. Then hickories appear with the oak, and finally, under most conditions, maples and beeches displace all other trees."

Rocks and Their Origins. G. A. J. Cole. 12 x 16½ cm. 175 pp. Camb. Univ. Press, 1922. 2nd edition.

We are glad to note that this useful essay by our former President has been in such demand that a second edition is now issued. It is well illustrated and indexed, and has a useful bibliography. The author tells us in his preface " that text books are merely signposts to set us on the path of the pioneers. Our own eyes must guide us in the quest for origins, where the burst of the long sea-roller swirls the pebbles on the shore, where the stream curls up among volcanic clefts, or where some fire-swept clearing in the forest reveals for the first time to human observation an acreage of antique rock." Students who want an interestingly written pocket-guide to help them make the most of the geological facts they see around them, cannot do better than buy this little book.

La Terre et l'Evolution Humaine. Prof. L. Febvre (Strasbourg). Paris, La Renaissance du Livre, 78, Boulevard St. Michel. xxviii x 472 pp., 20.5 x 14.5 cm, 7 sketch maps in text. 15 frcs.

This is one volume in an interesting series under the title of Human Evolution; the editor is M. Berr, and other volumes include prehistorics by J. de Morgan, Language by J. Vendryes, Race Study by E. Pittard, and so on, while volumes on Germania, Persia, China and Central Asia, India, etc., are promised, as well as about 14 books on ancient Mediterranean civilizations.

M. Febvre discusses critically the relations between sociology, history, and geography, and is not afraid to lay himself open to sharp retorts in his occasionally pungent remarks. He is probably right in choosing to be bright at some risk rather than dully safe. He fights over again the battle for the standpoint of Vidal de la Blache against the standpoint of Ratzel and his disciples, choosing often to give the Ratzelian view in a rather extreme form for the sake of clarity. Many of us will have thought that battle ended long since in a victory for the comprehensive modesty of Vidal de la Blache, always conscious of the complexity of every situation and of the dangers of generalisation, but Febvre is right in noting repeated lapses of many writers into the extreme Ratzelian view that environment dictates men's course of action. The text of the Influence of Geographical Environment is dangerous and of questionable value, for it leads us to try to determine relations of cause and effect between certain features of environment and certain human activities, whereas in practice those environmental features are always a part of a whole complex of factors, physical and human, that defy analysis. We may analyse out the parts of the body with profit only provided we remember that their life and work is something more than the sum total of the work of the parts.

A great deal of space is devoted to the theme that man is increasingly an active agent, choosing to utilise some of the opportunities offered by environment, and altering that environment in far reaching ways. Perhaps Febvre should remember more clearly the famous saying of Spinoza that men think themselves free for they know their desires, but know not the founts whence those desires spring. In fact the author hardly touches the ways in which environment has affected the bodily characters, and, at the same time the will-power and mental activity of man. Those who try to look at both obverse and reverse, at geography and anthropology, at the same time, will see whole chapters behind the discussions of Febvre, chapters that would not indeed make fundamental differences to his arguments about history, but would certainly affect his attitude to the old, old question of man and environment. He does not see half the subtlety of the problem.

The author attacks sharply the social morphologists who want simple generalised accounts of human societies on a ladder of " progress," hunting and fishing, shepherding, hoe-culture, and so on. The facts are nearly always too complex for this, and many a society of soil-cultivators has probably never passed through a stage of pure shepherding. He also attacks the rather too facile view that human geographers should confine their studies to the matter of the marks made by man on the surface of the globe, and he occasionally tilts to some purpose at Brunhes and at Cvijic.

There are some wise remarks on the folly of projecting modern circumstances into the past as casual agents. If one does that, it is as easy as it is puerile to argue, for example, that the rise of modern France, just as it is, was predestined by supposed physical circumstances from prehistoric times.

What are called physical circumstances, further, often have a human factor in them; the forest is almost always altered by the effort of man.

Finally, let us repeat his main point. The facts of environment do not dictate to man any one " necessary ' 'course of action; they offer him possibilities which may be alternative to one another, or may supplement one another, or may be both alternative in a measure and supplementary in a measure. The steppe does not necessarily dictate nomad pastoralism; it may be occupied and altered in part by sedentary irrigators, by schemes of dry farming, by traders' posts fed through imported stocks, and so on.

In short, this book, while open to a good deal of criticism, should be a valuable help to the geographer to avoid pitfalls in his work. There is a most useful bibliography at the end of the work.

Essays on the Depopulation of Melanesia. Edited by W. H. R. Rivers, with a preface by Sir Everard im Thurn, K.C.M.G., K.B.E., C.B. 13½ x 21 cm. 116 pp. Cambridge Univ. Press. 6/-.

The names of the late Dr. Rivers and of Sir Everard im Thurn stand for so much that is enlightened and humane in the consideration of problems of peoples of other civilisations, that they give us an index of the scope and value of the book. It has been the fashion to talk of the people in the lands from which Europe has drawn so much of her luxury and trade as " The white man's burden." In a paper on " The Solomon Islands " in this little book, the Rev. A. J. Hopkins, after fourteen years of intimate working among the natives, says emphatically " the white man is the black man's burden," and few will read the present series of essays without feeling that he is uttering an all too painful truth. Probably most of us will learn with surprise of the labour system which takes the young men and maidens away from their native islands and compels them to live under unnatural and often immoral conditions for the best years of their life, dumping them back again when disease has overtaken them and despair and lack of interest in life have robbed them of their buoyancy. Every thoughtful citizen interested in the good name and high standard of his country should read these essays, and consider whether there is no practical way of improving the situation in Melanesia.

A Short History of the World. H. G. Wells. London. Cassell. 1922. xvl. 432 pp. 25 x 18 cm. 15s.

To take us from a Nebula to an English garden through all the great issues of history in one small book is an achievement that leaves the reader amazed and yet stirred to the depths if he has a spark of imagination. It would be easy to take any chapter and show that the treatment is open to much criticism, sometimes on matters of fact, often on matters of interpretation, but to turn aside into that by-path would be to proclaim oneself incapable of seeing the boldness of a genius who has tried, with much effort and care, to give an outline that he who runs may read.

It is true that many who read will probably falsely imagine they understand more than is really the case, but Mr. Wells' book is not the first to suffer in that way; one has but to think of common misinterpretation of the Bible by ununderstanding readers to know that by this very process of misinterpretation truth gets distilled out for us in the long run.

Mr. Wells bases his thought on the " reign of law " in the universe, and one can see the disciple of the school of Huxley, with many a difference politically, written over page after page. To him history from the ancestral nebula to the prospective world-polity is all one, and his concept of the oneness of humanity follows therefrom in a simple direct fashion. Mankind is one at and from the start. In passing we may express the hope that Mr. Wells will see his way to revise the section on the first true men and their world in the light of all the new knowledge that is growing up, his own reading has led him to appreciate cave-art, but the pageant of changing climates of Europe, and all they imply, does not seem to have gripped him as yet.

The thought of the unity of mankind prevents Mr. Wells, whatever his failings, from getting his story splashed with the mud of a patriotic prejudice, and it is as refreshing as it is rare to find this quality in a record of the past. Those fatal prejudices continually creep into most books, even though an author may not be conscious of their hold on his mind.

There are many things to improve upon in the " short history," and Mr. Wells' personal views come out strongly here and there, though one is surprised that a Labour leader does not emphasise the knowledge of his own value that came to John Hodge as a result of the " Black Death." But a fine feature is the insistence on big things, and the relegation of the stories of Kings and States and their conflicting ambitions, their wars and treaties, to a minor place. In the reviewer's opinion all this is the seamy side of history, material that specialists must study, as specialists have to study " seamy " subjects for purposes of the law courts; but it is the growth of human opportunity and expression that is the main theme, and that needs to be set forth with all its setbacks and its failures by the way. Mr. Wells makes a considerable attempt in this direction.

That Mr. Wells has a certain geographical instinct is apparent from many a paragraph, but one short passage brings it out so clearly that it must be quoted. It heads the chapter on " The Age of Armament."

" The progress in material science that created this vast steamboat-and-railway republic of America, and spread this precarious British steamship empire over the world, produced quite other effects upon the congested nations upon the continent of Europe. They found themselves confined within boundaries fixed during the horse-and-high-road period of human life, and their expansion overseas had been very largely anticipated by Great Britain."

The reader of this review will, it is hoped, realise that it is a pageant that Mr. Wells offers him in most attractive and often compelling form. He will do well to read the " Short History " with all his critical wits about him, and if so he will find hundreds of points on which to fasten. But he will surely feel that Mr. Wells' effort is a worthy one for the redemption of humanism in education. For this we thank him sincerely.

The Sea Gypsies of Malaya. W. G. White. 22 x 14 cm. Pp. 318 and folder map. 20 illustrations. Seeley, Service and Co., 1922. 21/-.

An account of the nomadic Mawken people of the Mergui Archipelago, with a description of their boats, ways of living, customs, habits and occupations. This book is an altogether delightful study of a people whose way of life is so remote from our own, that only an author whose mind was steeped in that true sympathy which expresses itself as an attempt to appreciate other points of view, could have written of it in this strain. In accord with this spirit, our author was at pains to master the language before going among the people, no easy task when there was no written record, but readers of the book will realise that the effort was well worth while. The last chapter is especially important since it touches on the question of the responsibility that ought to be felt by the government for the prevention of the extinction of this intelligent, though untutored, people of our Empire, and, moreover, it gives an outline of a constructive policy which might lead to great improvement in the conditions of life for the Mawken, and to increased knowledge on our part since their intimate familiarity with the Mergui Archipelago and its flora and fauna could be developed and expanded, instead of being allowed to die out. Psychologists will find much of interest in the chapter on " How Suggestion Works," while teachers in search of those intimate details of other people's lives, the description of which gives so much pleasure to young children, will find the book a real storehouse.

From Mountain to Sea. By E. G. R. Taylor. pp. 146 6½in. x 8¼in. Price, 3/-. Geographia.

This is Volume I of the " Wonderbook Geographies," and has several points deserving of serious consideration. The majority of " Readers " for the young child seem to have been carefully enough compiled with reference to the interest of their separate chapters, but as these seldom, if ever, have any continuity or connection of one with the other, then the total product usually appears to be extremely artificial. In the volume under review not only are the separate chapters interesting, but much thought has evidently been expended on the plan of the book as a whole. It is highly successful, and numerous excellent prose and verse sources have been laid under contribution. The connecting thread is the circulation of water from the mountains to the sea, but it is not a physical geography, as the term is usually understood; it is a well illustrated human geography, and the peoples of the coast lands, islands and plains are very much alive. There is a very good appendix for teachers, with many useful tips by the author—herself an experienced teacher,—but there is no index. Probably the only serious criticism likely to be levelled against the book will be in connection with lines one and two of the Preface, where we are told that the book is intended " for children of seven and eight years old." The work in many places earns the title of Wonderbook, but the pupil, of the age suggested, who really got hold of Chapters II and III would still more certainly earn the title of Wonder-child. Its thoughts there and elsewhere are too advanced for such pupils; if children of nine and ten years old ranked its contents as their only geographical equipment they would be very little below normal. W.E.W.

The Geological Story of the Isle of Wight. Rev. T. Cecil Hughes, B.A. 1922. Edward Stanford. 5/-.

This book gives not only " The Geological Story of the Isle of Wight," but also a general introduction to a study of the science as a whole. The book is readable. Rarely does the author mention a geological term for the first time without explaining it in a very lucid manner, and many of the explanations are accompanied by simple but telling illustrations. The book will be of great use to the geological student, to the visitor who knows little or no geology, but more especially it should be prized by all the teachers of geography and geology on the island.

The author commences with an introduction to the subject, in which he clearly and carefully makes the reader familiar with the meaning of the many geological terms used throughout the book. The account of the statigraphy of the island which follows, and which forms the main part of the work, although possessing a large amount of exact and detailed information, could be understood by any normal schoolboy on the island. One chapter is devoted to a rapid survey of the geological systems found in Britain, another to the evidences of the Glacial Period on the island, and an excellent one to river development. The last chapter is an account of the evidence found here of the presence of Palæolithic and Neolithic man.

The book contains a number of good illustrations and drawings of fossils, as well as a simplified Geological Map of the island. The author would have made the book much more useful had he added a list of the best excursions upon the island, giving a list of the best exposures with the fossils found in each (he refers to one such book which is out of print). One has no doubt, after reading the book, that the author knows the Isle of Wight thoroughly, and that he is well qualified to publish such a list of itineraries. J.P.

The Partition and Colonization of Africa. Sir Charles Lucas. Oxford at the Clarendon Press, 1922. 228pp., 23 x 15 em. 12/6.

This is a series of eleven lectures by a former president of the Association, whose name is in very high honour among us and among all students and thinkers. After a short sketch of earlier times, the author enlarges upon the 19th century in Africa. His survey of the slave trade goes beyond mere denunciation into an exposition of the results of that trade, not only upon America, but upon Africa, which it has kept back or even thrown back. A preserve for " human game " must be kept close, and Livingstone's great effort was for openness, that human game might be hunted no more. We may at times wonder whether the change from slavery to some systems whereby natvies are " moved " and made to work regularly for others, are easily distinguishable from slavery by the native mind, and also whether they are economically a success. Sir Charles gives two lectures containing a good deal of trenchant criticism on " The Scramble for Africa, 1884—1914 "; his remarks on British and Boer being of a very balanced character, though he does not discuss the question as to the probability of Britishers ever settling the interior of Cape Colony agriculturally. The concluding lecture on problems of the present should be read by every student of Africa. It upholds the view that natives should work for themselves rather than for wages; that they should be encouraged to cultivate continuously and for export rather than spasmodically in their old way; that they should be guided through native leaders, and, above all, that whether through mandates or througha system of mutual checks by the powers of the temperate lands, Africa should be prevented from becoming a pawn of the militarists and a source of hired armies which might one day encourage Africans to crusade against the civilizations of Europe.

The Daily News Key Atlas to a Re-constructed World, the new frontiers. 56 pages of maps. Prepared by Messrs W. and A. K. Johnston; introduction by H. Wilson Harris. 32 x 25.5 cm. Daily News, Bouverie Street. 1922. 5/6.

The words " reconstructed world " in the title suggest someone's grim sense of humour, but Mr. Harris makes it fairly clear that the reconstruction is still in progress, and even hints of some likely changes. Something near the present state of boundaries is very fairly indicated in these maps, and this gives the little book a claim on the attention of teachers who may be using good atlases issued before the war and may need a supplement with the present boundaries. We note that Vilna is left in Lithuania, that Eastern Galicia is shown as part of Poland (but Mr. Harris has a note on this point), and that the recent Greek losses of territory temporarily held are marked. The map of Ireland is coloured according to percentages of Catholics and Protestants respectively in each county, and the boundary of the Free State and Northern Ireland is given as that of the "6 counties." A few historical maps are introduced, and maps of the former German Empire are given, including one which marks its losses of industrial areas conspicuously. A telling map illustrates the political problem of Australia in a way which rather understates that problem than over-emphasises it. Many of the names are given in accord with the list issued by the Permanent Committee on Geographical Names, at least in two tables at the end, but on the one hand some names are left as they were in pre-war days on the maps, and on the other some new names are given as used locally rather than in the form chosen by the Committee. For its purpose as a supplementary atlas the book seems quite useful; we would only beg that political boundaries should be put on physical maps rather than that political colouring should continue to dominate atlas making.

Rasse und Kultur. F. Hertz. viii + 421 pp., 23 x 15 cm. Kröner, Leipzig, 1915. Original price, 6 marks.

We are only gradually getting to know what was written in Central Europe during the war, and it is of special interest to note this book, the work of a thinker who has held high political office in Austria since the revolution. Its interest is two-fold. Firstly, it gives us a useful survey, by a man who is not a specialist in physical anthropology, of the ever renewed problem of ' 'race and environment." Some of the literature quoted will be found worth following up, even if the general statements seem to need modification in the light of newer thought. Secondly, the book gives us a detailed and merciless exposure of the notorious " Foundations of the XIX Century," with which H. S. Chamberlain exercised so much influence both in Germany and in America at one time. By most Englishmen not too much bitten with the idea of the " White Man's Burden," that book was a subject for ridicule in the main, and so, for us, the criticism is superfluous. Hertz is, however, led to a careful and sympathetic discussion of the Semites, which has useful features and is clearly backed, as it should be, by a study of Robertson Smith; unfortunately Doughty is not mentioned, his thoughts could have saved the author from some minor errors. It is an interesting book and an indication of an interesting and valuable mind; we hope it may be re-written up to date, with less attention to Chamberlain and more to the general problem.

Rassenkunde des deutschen Volkes. H. Günther. München, Lehmann. 1922. iv. x 440 pp. 23 x 16 cm. 8 maps and 409 illustrations, mostly photographs of types.

Deutschland. G. Braun. Vol. I—XI x 38' p. Vol. II, 33 plates. Berlin, Bornträger. 1916. 26 x 17 cm.

We are only gradually getting to know what has appeared in Germany of late years. The second of these books is particularly valuable to the teacher, and should be in widespread use. Its scheme is orthodox, building itself upon physiography, geology, climate, river systems and vegetative regions, treated in this order. The alteration of the environment by man in the process of settlement is next treated to a large extent on Schlüter's lines (see Hoops Reallexikon, Vol. I), and using Meitzen's conclusions. Two-thirds of the volume is, however, given to descriptions of districts. The valuable bibliography occupies 50 pages.

Needless to say, there is not in this book any evidence of a genius like that of Vidal de la Blache,but it is a worthy effort to portray Germany, and its collection of maps will be found more useful than a good deal of text. The student working out types of settlement and of houses should also have at hand Nos. 121 and 192 of the Teubner Leipzig series, entitled " Aus Natur und Geisteswelt." No. 121 deals with the peasant house in Germany (C. Ranck) and No. 192 with the German village (R. Mielke) ; both were revised just before the war.

The book on the races of Germany is not so much a work for the expert as for the serious general reader. It does not give anything strikingly new, but goes into much detail about the bodily and mental characters of each of the chief race-types in Europe. Of these it describes four, elevating the Dinaric tfpe of Deniker and Ripley to full racial rank. The Mediterranean race of Sergi and Ripley is called the Western Race, and the Alpine race of Ripley and Myres is, with less justice, called the Eastern Race. The book utilises Ripley at every turn, and this is to be counted to it for righteousness. Its large collection of photographs gives added interest. Many of them are of famous men, some long since dead, and the racial labels are put on rather too freely. A long section treats of the Jews in Europe on the basis of Fishberg.

Everyday Life in the New Stone, Bronze and Early Iron Ages. M. and C. H. B. Quennell. London, Batsford. 1922. x + 120 pp. and table. 19.5 x 12 cm.

This little sequel to the " Old Stone Age " Volume is the outcome of an obviously deep interest in all that relates to the arts and crafts, but it suffers unfortunately from the authors' lack of perspective in the complex archæological field they have tried to occupy. The neolithic period is an uncharted chaos between the Magdalenian age on the one side and the utilisation of copper and bronze on the other. Soon after its advent it is probable that forests spread far and wide in Europe north and west of the Alps, and small groups of older peoples may have survived isolated here and there, in Britain perhaps more than elsewhere.

The peoples who learned to live on the free-spaces in forested lands appear to have developed cultivation which, in Europe, may well have preceded herding. These activities meant a supply of soft food for the babies after the mothers' milk was exhausted. The invention of stone-grinding allowed the wedge to come into general use, and made wooden buildings more possible, so that homes and pottery could be developed. What this meant for the arts and crafts as well as for the children of the time in increased protection and prolongation of growth and educatin may be surmised, it wuld take too long to argue it out here.

The authors ascribe hill-top camps to the Neolithic Age in Britain, and here they are against all modern students who are convinced that the camps are of Iron Age, and in some places even of Romano-British date. The reader who is interested should study Dr. G. B. Grundy's article in the Archæological Journal, Vol. XXV, articles by Dr. Wheeler and by Mr. R. U. Sayce in the Transactions of the Hon. Society of Cymmrodorion 1920-21, and a number of reports by Mr. Willoughby Gardiner on Dinorben, etc., in the Reports of the British Association and Archæologia Cambrensis for some years past.

The authors have evidently read widely, and on several points are well informed. It would be too much to expect all round up-to-dateness in the most difficult of all the fields of study of the past. We can but hope that they may develop this book into a wider and fuller one. Their loyalty to essentials is most praiseworthy, and gives their work a special educational value.

The Bronze Age and the Celtic World. By Harold Peake, F.S.A. London, Benn Bros., 1922. pp. 201, with xiv plates. 42/- net.

It is difficult to speak with appropriate restraint of the breadth of knowledge, the imaginative insight, and the ingenuity which Mr. Peake has brought to bear upon his subject in this study of the Celtic problem—one of the most intriguing in European archæology. Some two thousand years ago, as we know from a number of sources, the geographical range of the Celtic tongues was far wider than it is to-day. Mr. Peake's aim is to show where these tongues originated and how and when they spread to those areas in which they were spoken in the century immediately before the Christian era. His enquiry is based primarily upon anthropological and archæological data, of which he considers the distribution of the Bronze Age leaf-shaped sword—so-called from the shape of its blade—to be the crucial piece of evidence. From this, by a detailed analysis, he pieced together a coherent pattern, and has applied it to that of the philological evidence to mark how far the two coincide. He has thus evolved a theory of Celtic origins and migrations which, if at one or two points it may fall short of complete logical proof, does offer a reasonable probability in all its elucidation of the facts as known to us, and gives fair promise tohold the field for some time to come.

Mr. Peake has a clear conception of the fundamental character of the issues involved in his problem. For his purpose it is not sufficient merely to examine the ethnical character and relations of the peoples of the Bronze Age. He recapitulates, or rather, re-states in outline the evidence relating to the types of man which existed in Europe from earliest times. It will be realised, therefore, that the first part of his book, in which he deals with this evidence, covers many difficult and highly controversial questions. He dwells upon each with a touch that is invariably illuminating. In fact, his early chapters, apart from their special purpose, might serve the student as an introduction to prehistoric archæology to better purpose than many of the professed text books. Space precludes detailed examination of Mr. Peake's treatment of this part of his subject. It must suffice to say that he suggests that in Solutrean Man—a distinct race with distinctive culture, intervening between Aurignacian and Magdalenian Man, and possibly represented by the Combe-Capelle skull,—we have the ancestor of the Neolithic Kurgan people of South Russia. Further, it is suggested that these people, taking into account what is known of their physical character, their culture, and their nomadic habits, gave rise to the race we now call Nordic, and advancing into the Hungarian plain and Central European mountain zone, came into contact with and became the overlords of the broad-headed Alpine race which entered Europe from Asia in late palæolithic and neolithic tifes. This Central European mountain zone Mr. Peake argues was the Celtic Cradle.

It is impossible to examine here in detail Mr. Peake's masterly analysis of his material, his unravelling of the tangled skein of racial elements and his exposition of the course of trade in the early Bronze Age, important as they are for his argument. We must pass by these questions to deal briefly with his " crucial evidence " of the distribution of the Bronze Age leaf-shaped swords—the most original and valuable piece of work in the whole book. The leaf-shaped sword has a wide distribution in Europe; it is found not only in Central Europe, but in Greece, Italy, France, the Baltic area, and in the British Isles. Two examples have been found in Egypt. It is a development of the Mediterranean bronze dagger. Mr. Peake argues that that development took place in the Hungarian plain, and that it was the characteristic weapon of the Nordic peoples who, on his showing, had irrupted into that plain at the time of a dispersion of the Kurgan peoples. Mr. Peake classifies the leaf-shaped sword into seven types, and by a careful examination of their distribution he has pieced together the story of Nordic migrations from B.C. 2200 down to the Christian era. As may well be imagined in dealing with the history of over two thousand years in an area extending from Mesopotamia to Ireland, many problems arise, and not a few cherished conventions receive a shock. Mr. Peake's suggestion as to the character of the Achæan incursion into Greece is hardly likely to pass unchallenged.

Turning to the philological evidence, which necessarily involves a consideration of the Aryan question, Mr. Peake argues that the geographical and other conditions indicated by an examination of the lniguistic data are fulfilled by the Steppe area occupied by the Kurgan people, and that this might therefore be the cradle of the Aryan-speaking races, while he adopts the theory of the late Sir John Rhys of the two migrations of the Q and P Celts from Central Europe. He then traces the wanderings of the Aryans, or Wiros, as he calls them, adopting Dr. Giles' terminology, and shows their coincidence with those of the Nordic race to whom he has attributed the use of the leaf shaped sword, equating those of the mountain zone of Central Europe with the Celts of Sir John Rhys.

In summing up, the general impressions left upon the mind by Mr. Peake's elaborate examination of the Celtic problem, it must be said that in each of the sections in which his book falls, he makes out a strong case, but the dovetailing together of his sections is sometimes a little weak. This fault, however, lies in the evidence rather than in the author. As an example of the flood of light which may be thrown upon the interpretation of archæological data by a detailed examination of type and distribution, it deserves the most careful consideration of all who are interested in prehistoric studies.

E. N. Fallaize.

THE GEOGRAPHICAL TEACHER

SUMMER 1923.

EDITORIAL.

THE Spring Meetings of the Association were held at Shrewsbury on April 23rd and 24th, and we are glad to take this opportunity of expressing our thanks to all concerned in making our visit so successful, and especially to Mr. Hinton and Mr. Stones, who undertook all the local arrangements, and to those residents of Shrewsbury who entertained the various members of our Council. Principal J. H. Davies, University College of Wales, Aberystwyth, spoke on "The Discovery of Wales in the Eighteenth Century," and pointed out that students of geography could do no more useful work than to study conditions of life in other lands and so avoid such misconceptions as arose at that date between even such near neighbours. He felt strongly that mutual forbearance and a proper understanding of the distinctive personalities of other countries would go far towards establishing world peace. Sir John Russell, our President, gave an account of soils with special reference to the district, and showed by slides how much agricultural research can do to help the farmer. His suggestion of a possible future working out of "probable risk" of bad crops, with a system of insurance against them, is one hope of helping the farmer to tide over the variations in crop value resulting from our difficult climatic régime. Miss Auden conducted members round the historic town itself, and placed her great store of local knowledge at their disposal. Mr. H. A. Hinton conducted a party by motor to Uriconium and Wenlock Edge, and gave an interesting description, which we hope to publish later, of the Severn valley from Shrewsbury to Ironbridge. The Mayor of Shrewsbury, Alderman T. Pace, kindly entertained the Council to tea, and gave them opportunities of meeting the chief people interested in education in Shrewsbury and the district. Mr. J. W. Stones, 7, Moreton Crescent, is anxious to hear from anyone in Shrewsbury and district who may be interested in the formation of the Shrewsbury branch of the Geographical Association.

TEACHERS of geography are specially asked to help to counteract the present focussing of attention in education on financial economy, not so much by urging expenditure as by finding ways in which ideals may be maintained in spite of our difficulties. The wave of low outlook on the training of youth can only be turned back by persistent individual effort, backed by an inspired vision. Administrative systems may be perfected to any degree, but in such an inward matter as education, perfection of that kind will not mean much advance unless personality makes scope for itself in the daily work. The old village schools of Scotland, and many an irregular school of old days in Wales, remain as triumphs of personal power directed towards a highly conceived goal, though administrative help in those days was far to seek. We, as teachers of geography, have the duty and opportunity of bringing subjects together and correcting some defects due to high development of specialisation in the past 20 years. We have also special opportunities for maintaining our freshness by travel, the results of which we can relate to our teaching more directly, perhaps, than could our colleagues taking other subjects. Moreover, we can make invaluable contributions to citizenship by studying and by helping our pupils to study the country round about us. Not only will they develop an interest in local betterment, but by learning to look at themselves objectively, they will diminish those over developed nationalistic prejudices which now so hamper both the search for truth and the evolution of a better world order.

THE Association is anxious to develop its lantern slide scheme. Professor Roxby, Mr. A. L. Minns and Miss L. Lee have kindly offered negatives as a beginning. The difficulty is that the inauguration of the scheme will involve heavy expense for cabinets, for printing of slides from negatives and for labour and overhead charges generally. We cannot plan the inauguration of loans of lantern slides, at the best, for some little time, but if help can be forthcoming, a start should be possible next year.

IN 1922 and 1923 the generosity of many scattered members brought about a great re-organization of our Lending Library of Books, which is now growing steadily and will become really valuable to the Association before many years have elapsed. The Association has achieved what seemed impossible, and the Central Office has dealt with transfers of great numbers of library books every day. This shows that the scheme is meeting a definite need.

THE scheme for loans of lantern slides would meet quite as important a need, and we should like to consider lantern slides as a part of the library available for library members. If branches could help this forward by means of raising corporate gifts for the purpose, the difficulty would soon be overcome. We need at least £50 apart from any expenditure on slides, and we have more than 50 branches in this country. May we appeal for help. The branches may be sure that their efforts will be backed by the Central Office as strongly as was the case in the movement for re-organization of the Library. The Touring Branch of the Geographical Association begs leave to acknowledge a gift of slides and negatives from Misses Burton and Walton. Will any other members of 1922 Tours, who are willing to contribute either negatives or slides, please communicate with MISS LEE, "Melford," Walpole Road, Bournemouth. Since the above was written the Bristol Branch has promised a large money gift and a collection of slides.

THE following courses in geography and allied subjects are announced in the Board of Education table of Summer Courses in 1923, (obtainable from Imperial House, Kingsway, W.C. 2. Price 6d.).

ABERYSTWYTH—Apply to Miss R. M. Fleming, Geographical Association, Marine Terrace.

CAMBORNE—Economic Geology, as illustrated by the geology of Cornwall. Apply to The Secretary, Mining School, Camborne.

CAMBRIDGE—Historical, Political and Economic Geography, Maps and Map-making, Land Forms, Anthropogeography. Apply to Rev. Dr. Cranage, Syndicate Buildings, Cambridge.

Derby Training College—General Teaching Course, including, as one of 13 subjects, the Teaching of Geography. Apply to Rev. Canon Bater, Training College, Derby.

Scarborough—As one subject in a group of the Pedagogy of Handwork, Practical Geography. Apply to Mr. J. Tipping, 35, Lower Rushton Road, Bradford.

London School of Economics—As one of three groups, Geography in relation to some Modern Economic and Political Problems. Apply to Mr. R. B. Forrester, London School of Economics, Houghton Street, Aldwych, W.C. 2.

Oxford University, through the department for the Training of Teachers. General teaching course, including the teaching of geography as one of 8 subjects. Apply to Mr. F. J. R. Hendy, 15, Norham, Gardens, Oxford.

It is also possible to obtain a "Table of Holiday Courses on the Continent" from Imperial House.

The attention of members is specially called to the Tours organised by the Association for the benefit of its members.

The next number of the Magazine will be distributed in November, and will contain notices of the Annual Meetings in London on January 3rd and 4th, 1924.

The next set of notes (No. VII) on Ordnance Survey and Map Issues by Mr. Wallace E. Whitehouse is held over until the Autumn Number of the "Geographical Teacher," as the material was received during the paging of the present number. The chief new issues consist of a rapid extension of the area covered by the Popular 1 inch Series; New Scottish ¼ inch sheets; Ministry of Transport Road Classification Maps, and the first sheet of the Revised Half Inch.

The attention of our readers is called to an interesting and important article in the Geographical Journal for May by the Archaeologist to the Ordnance Survey, Mr. O. G. S. Crawford. It deals with a number of new facts revealed by photography from the air. This has been tried on a fairly large scale, and with some care, on the Downs in Hampshire, and Mr. Crawfords finds the photographs in many places reveal a chequer of small spaces with very slight balks, often covering a considerable area on the upland. Near the chequer may be some indication of prehistoric habitation and related to it one may have an indication of an ancient track. Mr. Crawford suggests, as a basis for further discussion, that the photographs reveal a field system in existence probably before many of the hill-top earthworks (built probably just before Roman times or, in Wales, during Roman times). He thinks these upland villages of olden time, nearly all deserted soon after the end of Roman rule if not even before that, represent settlements of agriculturists in the early Iron Age and that there were practically no valley bottom settlements and perhaps no open-field systems till Saxon times. This is an interesting challenge to many views, and we hope it may be taken up and the subject pursued to the end. Mr. Crawford has, at any rate, added a new and apparently fruitful kind of evidence to our slender equipment, and he argues strongly for his view of the case.

The offer of special terms to members of the Geographical Association for certain books published by Messrs. Benn Brothers, Ltd. (now Messrs. Ernest Benn, Ltd.), ceases as from the date of the present issue. In offering our thanks to Messrs. Benn we have pleasure in stating that they are working out a scheme for publication of further geographical memoirs in conjunction with the Association. We hope to make an announcement on the subject shortly.

THE NATURAL REGIONS OF SPAIN.

(*Continued*).

An abstract specially prepared from
"Regiones Naturales de España" by *J. Dantin Cereceda.*
[2 vols. Madrid, 1922.]
For a General and Provisional Map, see "Geographical Teacher"
Vol. XII. p. 20. (Spring Number, 1923).

VIII. Oretanian Region.

The Montes de Toledo and almost the whole of Estremadura, with Evora and Portalegre (Portugal).

The mountains include the Montes de Toledo in the narrower sense (Rocigalgo, 1,448 m.), Sierra de Altamira, Sierra de Guadalupe, Sierra de San Pedro and Sierra de San Mamede. Guadalupe (1,558 m.), rising from a peneplain of approximately 700 m. in altitude, is the highest point.

Note the *rañas,* valleys filled under wetter climatic conditions with clastic diluvial deposits now subjected to erosion.

Geological Structure. Slates and quartzites of Cambrian and Silurian dates, usually in concordance; covered over a limited area by diluvial and miocene deposits (basins of La Serena and Los Barros). Numerous extensive patches of granite irrupted into the palæozoic formations.

Folding. The N.W.-S.E. Hercynian folds are here worn down into a peneplain, exercising, however, a decisive influence on the drainage (twists and curves of the Tagus and Guadiana).

From this peneplain stand up the mountains, protected from erosion by resistant caps of quartzite, and forming, according to Fischer, mere accidents in the process of erosion. Macpherson, however, considered the Toledan granitic meseta at least as forming with the granite of the Central System an arch of which the crown has fallen in and has been replaced by the Tertiary of the Tagus valley.

Climate. Mediterranean, extreme and dry; summers hot, as generally in the southern sub-meseta. Region belongs to Köppen's Warm Temperate Zone. Absolute maximum of 47° C. registered at Badajoz. Means exceed 20° from June to September. (Cáceres and Badajoz, 27°; Ciudad Real, 22° in August).

Mean annual range: 36°, Ciudad Real; 35°, Badajoz; 33°, Cáceres. Diurnal range large: Badajoz, 19°. Average of maxima reaches 35°, Cáceres and 36°, Badajoz and Ciudad Real.

Rainfall intermediate between that of the Manchegan and that of the Bætic region. Badajoz has 422 mm. annually; wettest month, 51 mm. (cf. Madrid, 49), and dryest month, 3mm. (contrast Madrid, 10). Steady monthly rainfalls of about 40 mm. from October to May. Extremely dry, crystalline atmosphere, with cloudless sky; soil bakes and cracks.

Vegetation. This region and the Marianic are specially characterised among the regions of the Meseta by the great development of the Scrub, particularly of the thicket of *jara,* chiefly *Cistus ladaniferus,* L. var. *maculatus,* either alone or with other *jaras, C. monspeliensis, C. laurifolius, C. albidus, C. crispus, C. populifolius,* or associated with broom, heather, daphne, etc., *Genista florida, Cytisus albus, Helichryson Stœchas,* D.C., *Daphne Gnidium, Erica australis* and *E. arborea.* Mastic and arbutus enter equally into the composition of the scrub.

Thin woods of the dry-climate *Quercus*: cork-oak, muricated oak, pin-oak (Q. *lusitanica*), holm-oak (Q. *ilex*, L.).

TRADITIONAL REGIONS IN THE ORETANIAN REGION.

La Jara, 2,338 Km², 17 persons per Km². Left of Tagus, bounded by Montes de Toledo and Las Villuercas. Name indicates typical vegetation. Extensive grazing grounds.

Campo Arañuelo, 1,078 Km², 18 persons per Km². North of La Jara, between the Tagus and the Tiétar.

Las Villuercas, 200 Km², 44 persons per Km². Mountainous region, with *gavias*, deeply-cut torrent-beds, in the upper valleys of the Almonte, Guadalupe, Ibor, Ruecas and Viejas.

La Serena, 2,533.5 Km², 32 persons per Km². Left bank of the Guadiana, from the Zújar to the Guadalmez. Cambrian and Silurian area, with irrupted granites.

Tierra de Barros, 2,209.5 Km², 25 persons per Km². Red clay soils producing abundant grain-crops.

IX. LUSITANIAN REGION.

Bounded by the Atlantic mesozoic formation on the W. and S.W. and by the Douro, the Castilian, Carpetanian and Oretanian regions on the N. and E.*

Includes the Sierras of Peña de Francia, Gata, Estrella and Guardunha which belong morphologically to the Central Dividing System, and the Sierras of Leomil, Montemuro, Alvellos and Louza.

The Zézere, separating the Sierra da Estrella from the Sierra da Guardunha, probably flows in a mere erosion-valley.

GEOLOGICAL STRUCTURE. Archæan and palæozoic rocks, especially Cambrian, with extensive granitic irruptions (Sayago, La Berzosa, Guarda, Vizeu, etc.).

FOLDING. Two systems of folding—that of the Central Dividing System (N.E.—S.W.) and the worn Hercynian folds (N.W.—S.E.). Each has its influence on the drainage system.

CLIMATE. Mean temperature, according to Dalgado†, 13.7° C. Rainfall, 1,044 mm. Guarda has a mean winter temperature of 4.25°, and mean summer temperature of 18.57°, with winter rainfall, 338.2 mm. and summer rainfall, 75.9 mm. Observations at Poio Negro (1,386 m.), in the Sierra da Estrella, show a mean winter temperature of 2.25° and mean summer temperature of 16.88°, with a total rainfall of 2,773 mm., the maximum rainfall registered in the Peninsula.

VEGETATION. The *Genista lusitanica*, L. is typical of the vegetation.

TRADITIONAL REGIONS IN THE LUSITANIAN REGION.

Sayago, ,1,413 Km², 22 persons per Km². Broken region of granite formation, on the Portuguese frontier between the Douro and the Tormes. Light sandy soils, poor in substance, yielding crops of rye. Wood-cutting and sheep-pasturing in the woods of holm-oak and in the scrub. Archaic pastoral customs. Ancient community of pastures and wood with centre at Torrefrades.

Abadengo, 383 Km², 32 persons per Km². On the frontier in the neighbourhood of Lumbrales.

Batuecas, 47 Km², 37 persons per Km². Mountainous country in the extreme south of the province of Salamanca.

Hurdes, 322 Km², 17 persons per Km². Rough, broken country in northern Estremadura, in the Sierra de Peña de Francia. Poor soils derived from Silurian and Cambrian quartzites and slates. Woods and scrub are those of arid, mountainous country. Chestnuts, rye, beeswax and honey.

Granadilla, 525 Km², 36 persons per Km². Ancient community of pastures and wood in the torrential upper valleys of the Ambroz and of the tributaries from the Sierra de Béjar and Sierra de Gata to the middle Alagón.

X. MARIANIC REGION.

The southern border of the Meseta, including the so-called Sierra Morena (which is merely the upturned lip of the great Bætic fault) with several true sierras, reliefs of the ancient Hercynian folds, lying to the north of it.

The rich diversity of relief of the Sierra Morena is explained by the variety of outcropping strata—chiefly Cambrian, Silurian and Carboniferous—by the complexity of the structure, and by the energetic action of the agents of erosion acting on a fault-scarp fully exposed to the moist S.W. winds from the Atlantic.

Seen from the northern side, the relief of the Sierra Morena is inconspicuous and arises merely from the outstanding relief of its harder rocks; on the other side, it rises in Ovejo 702 m., and in Villaviciosa 693 m., above the level of the bottom of the Guadalquivir depression.

Macpherson was the first to recognise the fault indicated by the contact of the Hercynian folds with the horizontal tertiary strata of the depression. More recently, however (1913), Groth described the Sierra Morena as due to a transverse flexion of the Hercynian folds which he considers to be partly buried beneath the transgressive marine Tertiaries of the Bætic gulf.

The true sierras lying to the north run in a N.W.—S.E. direction in the eastern part of the Marianic region (Sierra de Alcudia, Sierra Madrona, Sierra de los Santos); in the western part they run, more or less approximately, in an E.—W. direction (Sierra de Tentudía, 1,104 m., 50 km. north of the fault-line; Picos de Aroche, 708 m.; Sierra de Portel, 418 m.). Across the Guadiana, the sierras of Algarve are ranged from east to west to the north of the fault-line, but at no great distance from it. The highest points of this section are in the Sierra de Monchique (Foya, 802 m.; Picota, 774 m.). The southern slopes of the sierras of Algarve present no such abrupt scarp as that of the Sierra Morena.

CLIMATE. Closely analogous to that of the Oretanian region, the rainfall being, however, slightly greater, especially on the southern border and at the equinoxes.

VEGETATION. The *Quercus* of arid Spain are the characteristic trees of the region. Ash, *Fraxinus angustifolia,* Vahl; alder, black poplar, *Salix,* etc., are found along the river-banks in the low and the mountain zones.

The Bush is made up of *Arbutus Unedo,* L. (abundant); *Erica arborea,* L., 2 to 3 m. high, abundant up to 1,100 m.; *Phillyrea latifolia,* L., standing 3 to 4 m. high among the scrub; and, above all, mastic and terebinth, *Pistacia Lentiscus,* L. and *P. Terebinthus,* L. Rose-bay, *Neriumus Oleander,* L. is found in great profusion along the banks of the streams.

The characteristic plant of the scrub is the *jara,* which, beginning to be important in the Oretanian region, reaches its maximum development in a zone running from the Sierra de Alcaraz to Algarve over a distance of 570 km. The varieties of the *jara* and the species of the associated scrub have been sufficiently dealt with under the Oretanian region.

TRADITIONAL REGIONS IN THE MARIANIC REGION.

Campo de Calatrava, 3,180 Km², 64 persons per Km². The territory of the former order of that name coincides with a natural region of Silurian slates and quartzites, pierced by volcanoes of tertiary date, the former activity of which is now indicated by hot springs.

Valle de Alcudia, 970.8 Km^2, 3 persons per K^2m. A Silurian synclinal bounded by the Sierra de Alcudia on the south-west. The valley drains partly to the Guadiana by the Cabra, and partly to the Guadalquivir by the Jándula. Arid and waterless in summer, it affords pasture from October to June to sheep which migrate in summer.

Los Pedroches, 468 Km^2, 88 persons per Km^2. Between the rivers Guadalmez and Guadiato, where the Cambrian peneplain is pierced by an irruption of granite running parallel to the Hercynian folds. Drainage to the Guadalmez, the deeply-entrenched rivers showing wadi-régime.

Climate extreme. Soils either sandy, derived from the granites and quartzites, or clayey, derived from the altered Cambrian slates.

Spring and autumn pastures of sheep, goats and pigs.

The *rozas,* ancient system of clearing the scrub for cultivation, still employed. Territory originally undivided forming the *término común de las siete villas,* which enjoyed community of pastures not only between themselves but also with outside regions.

XI. LEVANTINE REGION.

An amphitheatre of mountains, hills and coastal plain, backed by the Meseta and facing the Mediterranean.

In the northern part, the folded mountains and high plains of the Iberic system reach the coast. In the South, the tectonic depression of the Segura is taken as the boundary with the Penibætic Region : the ranges of minor sierras of sub-penibætic folding which run out to the sea at C. de la Nao (the folds being continued after submersion in the northern cordillera of Majorca) are thus included in the region.

The *mola* or *muela* (Muela de Ares, 1,319 m.) is the typical form in the relief of the sierras of the northern section which are characterized by massive secondary formations, chiefly cretaceous. Peña Golosa, 1,819 m., is the highest point. The highest point in the southern section is Moncabrer, 1,386 m., in the Sierra Mariola.

The relief-forms of the region are extremely youthful and indicative of vigorous erosion. The rivers (Mijares, Palancia, Guadalaviar, Cabriel and Júcar) descend from the edge of the Meseta to the sea by steep, torrential courses, in which the frequency of entrenched meanders indicates a recent elevation in mass of the area. The Júcar in a large part of its upper course has invaded the Meseta itself. The rivers maintain this torrential character until within a few kilometres of the sea, where they open by narrow gorges to the broad littoral plain, largely built up from their alluvia. The rapid deposition of these alluvia has given a regular and graceful form to the broken coastline which remained after the foundering of the basin of the Western Mediterranean. With the exception of a few isolated salients (Cullera, Oropesa), nothing but dunes (Guardamar) and *albuferas* or large lagoons (Albufera de Valencia and, just outside the region, the Mar Menor) break the outline of the flat, gently-sloping plain.

CLIMATE. Mediterranean, par excellence. Series are, however, lacking except for the coastal plain. Here the annual and diurnal ranges are larger than on the mild Cantabrian coast Murcia and Alicante have an annual range of 26° and Cartagena of 23° C.

The reflecting power of the arid soil and the crystalline transparency‡ of the dry atmosphere accentuate the heat of summer. In the interior and in the extreme south-east of the region the climate is sub-desert. The intense radiation of the cloudless nights causes sharp frosts even at the close of spring and in the middle of autumn.

Cartagena, 8°, and Valencia, 10°, have a smaller daily range than inland Murcia, 12.5°; Alicante, for local reasons, has a higher range, 13°, than the other coast towns.

The rainfall diminishes towards the south-east. Valencia has 479 mm. per annum, Alicante 429 mm., but Murcia has 362 mm. only and Cartagena 340 mm. Further inland the annual precipitation falls, in places, below 200 mm.

The distribution of the rainfall throughout the year is as important as the total amount. The principal maximum is in September, earlier than the autumn maxima of the rest of the Peninsula, and the September rains, following abruptly on the extreme drought of August, lead to devastating inundations. Secondary maxima in March and May precede the drought of July and August.

VEGETATION. Partly Mediterranean, partly steppe.

The species characteristic of the Mediterranean vegetation have already been fully treated under other regions.

We may add that the pine-grove, made up of pines suited to an arid climate, is somewhat characteristic of the region, which is also invaded in the higher districts by *P. Laricio* and *P. Sylvestris* from the Iberic Region. The appropriate *Quercus* are equally abundant, while the lote-tree (*Celtis*), carob (*Ceratonia siliqua,* **L.**, on stony tracts and in the hill zone), jujube, almond, fig and pomegranate grow in profusion, either wild or cultivated.

The Bush. The rose-bay (*Nerium Oleander,* L.), here called *baladre,* appears along the banks of the streams in the low zone, as in the Marianic and Bætic regions; the mastic-tree is present but is not so abundant as in Andalucía; the true thorn, *Paliurus australis,* R. and S., standing 2 to 4 m. high, is found in the low zone. The *jara* is much less extensive than in the Oretanian and Marianic regions, but *Cistus Clusii,* Dun, and various other species are found in the low and the mountain zones and invade the neighbouring Penibætic and Catalan regions.

Myrtus communis is widespread.

The palmetto (*Chamærops humilis,* L.) the only Mediterranean dwarf-palm, is found by itself in patches on the driest sites most exposed to the sun, at altitudes from 0 to 800 m.

The Scrub. (a) The woody Labiatæ—*Thymus hyemalis,* Lgc., *Th. Piperella,* L., *Lavandula multifia,* L., *L. latifolia,* rosemary, sage, sweet marjoram give the winter air the balmy character which Laborde noted (*"Itineraire de L'Espagne"*). (b) Leguminosæ—*Colutea arborescens,* L. in the low and mountain zones: *Anthyllis cytisoides, A. genistæ,* Duf., on the arid hills of the low zone; *Coronilla Emerus,* L., *C. glauca,* L., *C. valentina,* L., *C. juncea,* L., *C. minima,* in the low and mountain zones, also found in Catalonia and Andalucia. (c) Thymelæaceæ—*Daphne; Th. tinctoria,* Endl. var. *vermiculata, Th. Sanamunda* on the driest and sunniest sites; *Th. hirsuta,* Endl. on sandy ground and on the coastal hills along the whole of the South and East of Spain; *Th. Tartonraira,* All., in the driest portions of the region and passing in its various forms, *Th.T.* var. *genuina, Th.T. angustifolia, Th.T.* var. *calvescens* to the Penibætic region. (d) Compositæ—*Helichryson Stœchas,* L. D.C. var. *cæspitosum, Artemisia hispanica,* Lam., *A. Barrelier,* Bess., *Achillea Santolinoides,* Lagasc.

THE STEPPE. The characteristic plants of the steppe formations are fully treated elsewhere. To these we must add *Microcnenum fastigiatum* (western arid sierras) and *Obione portulacoides, Salsola tragus, S. Webbi, S. oppositifolia,* these last also found in the Bætic and Penibætic regions.

STEPPE VEGETATION. A note on the vegetation of the steppe formations in Spain, which would more properly have been included in the Introduction, may be permitted here.

The steppe is of two kinds—the arid, or esparto, steppe, in which the esparto is the most characteristic grass (*Campus espartarius* of the Roman

Carthaginiensis), and the saline steppe, of the same type as the African and Asiatic steppes of the sub-tropical arid belt. Just as the scrub appears to proceed from the degeneration of the pine-grove or oak-grove, in which it forms a rough, dry undergrowth, so the steppe is reached by the gradual degeneration of the scrub, the transition being gradual both in space and in time.

A list follows in which the plants found in the saline steppe are given in alphabetic order; plants marked with an asterisk are specially noted as common to all the saline steppe districts of Spain.

> *Anabaxis articulata; *Arthrocnemon macrostachyum,* Moric.; **Atriplex Halimus,* L., **A. laciniata,* L.; *Camphorosma Monspeliaca,* L.; *Caroxylon tamariscifolium,* Moq. Tand.; *Haloxylon articulatum,* Bunge; *Kalidium foliatum; *Kochia prostrata,* Schrad., **K. scoparia,* Schrad.; **Obione glauca,* Moq.; *Ononis tridentata; Salicornia auceps; *S. fruticosa,* L., **S. herbacea,* L., *S. mucronata; *Salsola Kali,* Ten., *S. oppositifolia, S. papillosa, *S. soda,* L., **S. vermiculata,* L. (also var. *flavescens* and var. *microphylla*), *S. Webbi,* Moq. Tand.; **Suœda maritima,* Dum., **S. fruticosa,* Forsk, *S. pruinosa.*

AGRICULTURE. The individuality of the region is most marked in its agriculture, in the coexistence of drought and irrigation. The irrigated *huertas* on rich soils of red alluvia, form a zone of oases on the coastal plain and along the rivers, amid a landscape of steppe-like aridity. Next to the coastal zone is the zone of hills, where the characteristic plants are cereals, the olive, vine and carob. Behind these two zones lie the mountains with their pines and sabines.

At the point where the rivers break out of their narrow valleys on to the coastal plain, their waters are dammed for irrigation; from the Ebro delta to C. de la Nao, the irrigation works are confined to such dams, and the *huertas* lie on a coastal strip. In the drier districts of Alicante and Murcia, where the river supply is more irregular, the terrible floods of autumn following abruptly on the drought of summer, reservoirs (*pantanos*) have been built to regulate the supply; the *huertas* here lie along the river banks (Elche, Murcia, Orihuela, Lorca).

With such provisions for regulating the supply, the water is distributed by a network of *acequias* with innumerable branchlets, which divide the water among the cultivators, subject to regulations which vary from district to district; thus, in the Huerta de Valencia, the ownership of the water is vested in the whole body of cultivators, the supply is without charge, and the ancient elective *Tribunal de las Aguas* deals with infractions of the rules; in Murcia a similar tribunal is called *Consejo de hombres buenos.*

At Elche and Lorca private companies own and supply the water, which is sold by daily auction to the cultivators.

The *huerta* of Alicante is intermediate in type between that of the coastal plain to the north and that of the Segura-Sangonera depression to the south. In the Lorca district, irrigated fields of cereals replace the *huertas*.

In the *huertas* everything is cultivated, but more especially vegetables and fruits, in an endless succession of crops. Denia specialises in grapes for raisins, Oliva in mulberry and olive-trees; the Ribera del Júcar grows oranges, mulberries, pomegranates, palms; Elche has a grove of 80,000 date-palms, the finest in Europe.

POPULATION. The population is distributed in four well-marked zones. The pastoral districts of the interior are as sparsely populated as the Meseta itself; an intermediate zone follows corresponding to the hill-zone in which cereals, the vine and olive are cultivated; in the zone of *huertas,* irrigation concentrates the population, organises it for collective use of the water and increases riches and well-being; the sentiment of liberty takes deep root and the arts flourish: on the sea border, the population is engaged in fishing and in handling the fruit for transport to northern Europe.

TRADITIONAL REGIONS IN THE LEVANTINE REGION.

Plains of Vinaroz and Benicarló, 425.25 Km², 60 persons per Km².

Maestrazgo, 1,678.5 Km², 39 persons per Km². Mountainous region of cretaceous formations, dissected into a number of small mesetas, between which the villages lie in deep arid valleys.

La Plana, 508.5 Km², 192 persons per Km². Plain of Red Diluvial, closed by a zone of arid hills and fringed on the sea-border by a cordon of dunes which impede drainage and give rise to marshes. The *huerta* along the Mijares and the chief town, Castellón de la Plana, are withdrawn from the marshlands and are consequently at some distance from the port, Grao. These relative positions are repeated in the other regions of the littoral plain.

Rincón de Ademuz, 472 Km², 21 persons per Km². Mountainous region in the Trias and Cretaceous of the upper Turia, with groves of pine, sabine, juniper and oak, but without the olive or carob-tree of the low zone. Stately walnut-trees stand in the miocene valley-bottoms.

The products are wine, hemp, kidney-beans, beeswax and honey.

Valle de Sego, or Valletes de Sagunto, 77.9 Km², 64 persons per Km².

Huerta de Valencia, 405 Km², 828 (or, excluding the city of Valencia, 436) persons per Km². From Puzol to Catarroja and from Villamarchante, in the hill-zone, to the marshlands of the coast. Here thousands of *barracas*, each with a fig-tree at the door, lie in a setting of orange-trees round the city.

This density of population dates back to remote ages; it has no parallel in the world, outside modern industrial regions, except in the Ganges delta and in the valley of the Nile.

Ribera del Júcar, 1,866.3 Km², 97 persons per Km². The upper portion of the region lies on the Cretaceous; to the lower portion, in which the Cretaceous is overlain by alluvial deposits, belongs the Albufera de Valencia, a lagoon of 33 Km², communicating with the sea through the dune belt by the narrow channels of Perelló and Perellonet. In this well-irrigated region, there are extensive rice-fields, orchards of fruit-trees (Alcira, Carcagente; pea nuts grown at Sueca and elsewhere) in the fine-grained sands of the lower Júcar.

Huerta de Gandia and Huerta de Oliva, 108 Km², 434 persons per Km². A narrow strip of Red Diluvial, crossed by the Serpis or Alcoy. Cereals, alfalfa, vegetables, the mulberry (for silkworm-breeding) and the vine are cultivated. Former cultivation of the sugar-cane accounts for the presence of the many cane-mills.

La Marina, 497.25 Km², 144 persons per Km². From Denia to the Diluvial of the Huerta de Alicante. A picturesque region which includes a district of Trias pierced by eruptive rocks. The coast is formed by cliffs in a great part of this region. Grapes for raisins are a speciality.

Huerta de Orihuela, 251.43 Km², 312 persons per Km². On the lower Segura, below the Huerta de Murcia.

In the joint rural and urban administrative district of the town Orihuela, the population of the rural portion exceeds that of the urban in the ratio of 5:3.

The corresponding figures for the district under the administration of the city council of Murcia are 3:2.

Huerta de Murcia, 699 Km², 190 persons per Km². In the elbow of the Segura, where it assumes the N.E. direction of its tributary, the Sangonera, along the line of the great Penibætic fault.

XII. Iberic Region.

On the N.E. border of the Meseta, descending by steps to the tectonic fosse of the Ebro. A region of high plains and mesetas and of forms determined by the folding of the sierras. The recent elevation of the Meseta, which reached its maximum along this north-eastern border, is evidenced by the deep, narrow valleys of the rivers, both of the Mediterranean and of the Atlantic slope, and by the youthful appearance of the erosion-forms. The Jalón, in its upper course, cuts back into the Trias and Miocene of the Meseta, passing thereafter by a deep, narrow gorge through the folded Silurian to the east and receiving on the right the Jiloca from the broad synclinal of Daroca.

Karst forms (*torcas*) are found in the limestones, of various ages, of the Serranía de Cuenca, and the broad *navas* of the Guadazaón are of special interest.

Geology. The palæozoic formations and Hercynian folding of the Meseta are widely exposed in this region. Horizontal secondary deposits cover large areas, particularly the Jurassic and Triassic deposits stretching from the Montes Universales to the Sierra de Atienza. After the deposition of the secondary strata, the region was broken up by a series of parallel step faults. Later still, the continental Neogene entirely covered broad tracts (region of Almazán), in other parts filling up the synclinal valleys (valley of the Jiloca).

The principal sierras are: Sierra de la Demanda, of palæozoic formations, connected with the Cantabrian System below the neogene deposits of La Bureba; Sierra Cebollera, of cretaceous formations, and the Moncayo, Sierra de Algairen and Sierra de Vícor, in each of which a base of Silurian slates is overlain by the horizontal deposits of the transgressive secondary seas. These last three sierras, running from N.W. to S.E., form, geologically speaking, the lower steps of the descent from the high plain of Molina to the Ebro.

Climate. The climate is similar to that of the Castilian region but more extreme, this region being at once the bleakest and coldest and the most arid § and desolate in Spain. The winters are long and cold; the summers short; the daily and annual ranges of temperature are high.

Teruel has a mean annual range of 36° C. (mean max., 33°; mean min., 3°) with three months of temperatures below 5°. The corresponding figures for Soria are: 33° (29°,—4°) and four months, and for Molina de Aragon; 36° (30°,—6°) and five months (November to April.

The absolute extremes of temperature are 42° (Soria) and—27° (Molina de Aragón, the lowest recorded temperature in Spain).

The mean annual rainfall is 415 mm., spread over 80 days in the year. The maxima are in September, the principal maximum, and in May, both frequently accompanied by very heavy storms, and there is a secondary maximum in March.

The January minimum is less than that of summer (August).

Vegetation. On the heights and in the humid valleys of the Sierra de la Demanda, beech, birch and oak (*Q. sessiliflora*) are frequent. The birch (*B. verrucosa*, Ehrh.) has its home in the Cantabrian and in the Pyrenean regions, but is found also in this region and in the Carpetanian.

Over the greater part of the region, under the arid conditions which prevail, pines (*P. laricio, P. pinaster, P. halopensis, P. sylvestris*), oaks, (*Q. Toza*, etc.), yews, juniper-trees and sabines are the principal trees, with elms and black poplars along the banks of the streams. The conifers, although found in some degree in every part of Spain, have their home in this region: the pine-woods cover broad tracts (Tierra de Pinares, e.g.) and give rise to industries (the resin industry, wood-cutting, etc). The yew-tree is shared by this region with the Cantabrian, Pyrenean and Penibætic regions. Junipers and sabines are also characteristic: the Spanish cedar (*J. thurifera,* L.), found on the mesetas from 800 to 1,400 m., has its true home here, forming extensive woods which cross into the Carpetanian and Levantine regions.

The scrub varies with the altitude. On the heights of the Moncayo, the blueberry (*Vaccinium myrtillus*), and on the Demanda, *V. uliginosum* are found. In the pine-woods, *Genista micrantha* and the barberry (*Berberis vulgaris*) are common. In the scrub of Mediterranean *Labiatæ, Salvia lavandulæfolia* is specially abundant; the other constituent species have already been noted under the other arid regions. In the saline districts of the Neogene (Calatayud, Ateca) and on the salt-bearing Trias, small steppe areas exist, characterized by the presence of red saltwort (*Kochia sanguinea,* Wk.), found also in the Manchegan and Aragonese regions, and K. *arenaria* (Ateca). found also in the Aragonese region only. In the valleys, especially of the Jalón and Jiloca, there are fine orchards, principally of pear-trees.

On the high, desolate plains, stripped of vegetation other than pine-woods and scrub, the sparse population lives poorly by agriculture and by work in the scanty woods. Communal ownership of the pastures and woods, is, in places, deeply rooted in the social organism. Seasonal migration, to the mountains of Navarre, for example, is common over the whole of the area from Tierra de Alcañiz to the province of Valcenia, and there is some trade in live-stock with the rest of Spain.

The bare, desolate scenery of the region is reflected in the Poema del Mío Cid, the author of which must have lived and died here and probably never saw Valencia.

TRADITIONAL REGIONS IN THE IBERIC REGION.

Tierra or Campo de Daroca, 4,594.5 Km^2, 17 persons per Km^2.

Tierra de Almazán, 787.5 Km^2, 13 persons per Km^2.

Tierra de Agreda, 346.5 Km^2, 24 persons per Km^2.

Tierra de Cameros, 790.5 Km^2, 14 persons per Km^2. Upper and middle valleys of the Najerilla, Iregua and Leza, separated by the Sierra de Camero Nuevo and Sierra de Camero Viejo. At the foot of the fault scarp, in which these sierras terminate lies La Rioja, in the Aragonese depression. The valleys, lying in the mountain and sub-alpine zones, have the fruit-trees of Central Europe (cherry, plum, etc.). R.A.

* Note the correction referring to this region in the foot-note to the map.

† "The Climate of Portugal." Lisbon, 1914. Dalgado's figures appear to refer only to the Portuguese section of the region.

‡ The Kingdom of Murcia was the "*reino serenísimo, reino del sol y del aire*" of the poets.

§ Note, however, the first paragraph of the section dealing with Vegetation.

Town Planning in Patiala State and City. P. Geddes. 120 pp and folded plan. 33 x 21 cm. Lucknow: Perry's Printing Press, 1922.

Prof. Geddes here adds another to his series of reports for city betterment in India, and, as always, he seeks to build that betterment upon the past of the city in question. He looks at the city for its own sake, and while bringing to bear his wide experience of cities the world over, struggles to avoid the mechanistic outlook which visualises the world as a place to be re-moulded on some more or less logical plan. This report discusses seriatim proposals for a number of villages, and gives glimpses into village life we do not often get. Those who know the author will not be surprised to be told that he has a section on the philosophy of the garden; indeed, he recurs to that subject continually throughout the book.

AN AMERICAN VIEW OF GEOGRAPHY.

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WHAT does Geography include? Geographic Societies bestow most of their medals upon daring explorers. Many intelligent people believe that the late war radically changed the geography of Europe, rendering out of date everything written on the subject before 1914. Eminent geographers hold equally divergent views. This is unfortunate. Before Geography can obtain the place in the educational programme that it merits, geographers must be in essential agreement as to fundamentals, although, of course, the vast scope of Geography demands that each investigator must specialise. The following statement has been prepared in the belief that a clearer idea of the fundamental results from the study of divergent opinions of the scope of Geography.

In olden times, geography was regarded as a description of the earth's surface. It included an account of such physical features as the rivers, mountains and plains of the different countries, and also occasionally a description of the inhabitants and products. A generation ago, and in some places even more recently, work in geography consisted largely of drill in the names and locations of capes, bays, rivers, states and capitals.

Locational geography and other phases of descriptive geography are fundamental and have formed the chief work of most explorers. However, as the years have gone by, the accumulation of facts of location and of simple description has made possible the subordination of this aspect of geography. The camera has contributed notably to reducing the amount of verbal description necessary.

Modern geography has been defined as "the study of the earth in its relation of life," or more fully, as "the subject which is concerned especially with the physical features such as land forms, water and climate, and their effects on living things," or more technically, "the investigation of the environment and of life's responses thereto."

ASPECTS OF GEOGRAPHY.

Geographic study has four great aspects: (1) The selection of such facts, established by other sciences, as are helpful in understanding the earth environment. (2) The augmentation of knowledge concerning the geographic environment. (3) The recognition of life responses, and ultimately, the formulation of principles or laws of life-responses to the geographic environment. (4) The use of geography for educational purposes.

SELECTION OF FACTS ESTABLISHED BY OTHER SCIENCES.

The earth and its life have been studied from many points of view. For example, the form, size and motions of the earth are matters of astronomy as well as of geography; the origin and characteristics of land forms and the distribution of useful minerals are matters of geology as well as of geography; and the effects of physical conditions on plant and animal life are phases of botany and zoology, as well as of geography. It is not surprising, therefore, that many facts of great importance to geography have been discovered by workers in other sciences. Geography should select from the vast array of knowledge accumulated by other sciences, those facts which are helpful in solving its special problems. Many such facts have been selected already. Astronomy has contributed facts concerning the sun (the chief source of energy on the earth), as well as facts concerning the earth's shape, rotation and revolution. Mathematics in addition to performing inestimable service in surveying, has contributed calculations of the size of the earth, and of tidal occurrences and influences. Physics has established a large number of laws essential to the understanding of earth conditions, such as the laws of gravitation, diffusion, expansion and contraction with changes of temperature, the crushing point of rocks, hydrostatic pressure, the transfer of heat and of evaporation. Chemistry supplies knowledge of the various elements and compounds and their activity in nature and of the relations between heat and chemical activity. Geology explains the structure and character of rocks and useful minerals, the origin, character and distribution of physical features, and also tells much in regard to the conditions of the earth in past ages, when most existing life-forms were evolved. Biology, including anthropology, contributes detailed descriptions of the life of various geographic areas, thus facilitating the correlation of differences in life with differences in environment. It also has contributed the theory of natural selection and presented many clear-cut cases of response to environment.

LEARNING MORE ABOUT THE EARTH ENVIRONMENT.

The augmentation of knowledge about the earth environment concerns: (1) The climate, weather, and other aspects of the atmosphere; (2) the location, characteristics and alteration of the several sorts of land features and soil; (3) the bodies of water, notably the ocean; (4) the preparation of accurate and effective maps of the distribution of valuable natural resources, products, climatic conditions, and ultimately of all important types of life and resources found on the earth.

RECOGNITION OF RESPONSES TO ENVIRONMENT AND FORMULATION OF LAWS THEREOF.

When it becomes possible to predict responses to the geographic environment with half the accuracy now attainable in the predictions made in physics and chemistry, it may be said that man understands his physical environment. The environment is so complicated and life so complex and so varied, however, that the formulation of the laws of life responses has scarcely commenced. The responses to day and night, to seasons, and to certain phases of climate notably temperature, wind and rainfall, and to certain natural resources, have been partially formulated. Some of the responses to topography and accessibility are understood, but the influence of many other geographic factors such as light, air pressure, and the air in the soil, are little known.

THE EDUCATIONAL ASPECT OF GEOGRAPHY.

Geography is taught in the elementary schools of all civilised countries. The reason for its inclusion thus widely is that it is properly recognised as having especial and distinctive educational value. Training in geography, which includes the proper proportion of text-book work, supplementary reading, field study observation, laboratory work, map making, report writing, and quiz work, probably can be made, by a qualified teacher, as valuable in general education as training in any other subject.

AIMS IN GEOGRAPHY.

The three chief aims of geographers are :—To make known life's environment and its influences; to educate pupils more effectively for citizenship; and to discover facts about the earth the practical importance of which is not yet known, in other words, facts which are not known to be part of life's environment.

TO MAKE KNOWN THE EARTH ENVIRONMENT.

The contrast in attitude of the modern geographer and of the savage in regard to such things as eclipses, earthquakes, volcanoes, storms and animal migrations, suggests one aspect in which knowledge of the earth environment is important—the replacement of fear, superstition and magic by intelligent appreciation. Another way of stating this great aim is: To know all the resources and possibilities of each part of the earth and all the geographic factors which affect their utilisation of development. In still other words: To enable man to adjust himself intelligently to his environment and no longer to be "like dumb, driven cattle."

TO EDUCATE MORE EFFECTIVELY FOR CITIZENSHIP.

Many geographers have as their chief aim the general education of their pupils and have chosen geography because it lends itself admirably to this end. Teachers possessed of such appreciation for geography often are instrumental in inducing pupils to specialise in the subject, some of whom in later years advance the science of geography more directly by research work.

Geography is exceptionally well adapted to aid in preparation for citizenship. There are several ways in which that end may be accomplished through the study of geography:—

(1) It should supply the pupil with a large body of facts needed by all and not obtainable from the other courses studied in the elementary schools. No less useful than the knowledge of spelling or of division, are a comprehension of such facts as: "The land is the great source of wealth," "crop yields depend largely on climatic conditions," and "a favourable location is exceedingly valuable for any human activity."

(2) It should give the pupil a strong appreciation of the power of geographic influences. Such appreciation will make him alert to the need of knowing and adjusting himself to the climatic, topographic, locational, and other physical conditions which affect him and his work.

(3) It should develop in him an active interest in, and consequently a sympathetic attitude towards other people and lands. Such interest will encourage him to read highly educative literature and to travel. It will give increased value to reading and travel.

(4) It should give him a wider breadth of view and a more sympathetic attitude towards others as he realises how diverse are the conditions encountered successfully by man in other parts of the world. Thus it will be a powerful influence towards international peace and against jingoism and chauvinism by dispelling the special forms of ignorance upon which these are based.

(5) It should impress the pupil with the almost complete dependence of man upon the land and its resources. These early impressions doubtless will improve the attitude of the individual in future years in regard to such important questions as conservation and taxation.

(6) The value of the study of geography in increasing the realisation that effects follow causes, and in training the reasoning power, the eye, and the hand, is indisputable.

(7) Geography brings the student in contact with many other sciences, with history, economics and with many industries. It also acquaints him with many regions. Therefore training in geography will aid the student in selecting his special activity, and the place in which there is opportunity.

TO DISCOVER FACTS OF UNSUSPECTED IMPORTANCE.

Another aim is to discover facts in regard to the earth which are not yet known to have any value in enabling man to adjust himself to his environment but which may some day prove of great value. Much exploration, for instance, in polar regions is an illustration of this aim, which corresponds to "pure science" investigations in other fields. Other examples of this sort are many investigations of the distribution of plants and animals over the earth. Although many such facts have no immediate value, after a sufficiently large body of facts have been gathered, valuable and helpful conclusions may be drawn.

METHODS OF ADVANCING GEOGRAPHY.

The earth is the geographer's laboratory and many of the experiments—the reactions between life and environments—have been going on through the goelogic as well as the historic past. Most of these reactions have been so complicated that their interpretation is exceedingly difficult. One of the tasks of the geographer is to search for or produce relatively simple reactions, for after such are interpreted, more complicated ones may be understood. This study of relatively simple reactions is carried on by the study of certain aspects of historical geography, of regional geography, of biography, of ecology, and of what may be called experimental geography and also by searching throughout the world for responses to particular influences.

STUDIES IN HISTORICAL GEOGRAPHY.

Innumerable past events have been affected by geographic influences. Examples are: The rain preceding the battle of Waterloo frustrated Napoleon's promising plans. The extraordinary rainy summers of 1862 and 1863, resulting in an almost complete failure of the wheat crop in England, and increasing greatly her dependence upon the American "North" for food, helped to overcome the demand of cotton manufacturers for the recognition of the Confederacy. The Appalachian barrier largely confined the English colonists to the coastal region until settlements were fairly compact, until stable but flexible governments had been worked out, and until a sense of political unity had been developed. When expansion westward finally came, the results were permanent. On the other hand, with the French it was only temporary for being able to penetrate westward readily along the St. Lawrence, the Ottawa and the Great Lakes, they did so while still poorly prepared to hold the territory and inadequately reinforced by new arrivals.

STUDIES IN REGIONAL GEOGRAPHY.

Studies of little known regions have consisted chiefly of describing their features and other characteristics and making maps depicting the distribution of different features and elements.

Regional studies in better known areas are chiefly attempts to find the geographic reasons for the distribution of life and for its characteristics and activities. They, therefore, include a study of such influences as climate, topography, soil, mineral resources and location. As many facts of distribution, etc., are not due to local geographic conditions, but are a result of influences, geographic, historical, economic, and psychological, of other areas, strictly regional geographic studies of small areas are necessarily incomplete.

STUDIES IN ANTHROPO-GEOGRAPHY AND BIO-GEOGRAPHY.

Intermediate, in some respects, between historical and regional geography is the searching throughout the recent and the remote past, and in all parts of the earth, for responses to recognised geographic influences. What have been the results of changes of climate, seasonal changes, aridity, persistent cloudiness, of sunshine, cyclonic storms? What have been the influences of such physical features as plains, plateaus, mountains, and rivers, of prairies, bush and forest, and of coal and other natural resources?

While historical geography is concerned largely with somewhat striking illustrations of how geographic conditions have affected the course of history, this unnamed aspect deals with influences that seldom have been recognised by historians as being of much importance. It has an advantage over regional geography in not being limited as to area. Anthropogeography or human ecology is the name given to studies in human geography by this method. The term bio-geography is used for similar studies in regard to plants and animals. There ought to be some name for both these phases. Possibly "ecological geography" might serve.

STUDIES IN EXPERIMENTAL GEOGRAPHY.

Experimental studies cannot be carried out as easily in geography as in most other sciences, but they are being undertaken. Many kinds of plants and animals have been transferred, in many cases unpremeditatedly to different environments. Several careful studies along this line have been made already with insects and by many plant breeders with plants, and doubtless the experimental method will increase in importance. Another method, approaching the experimental, is the detailed study of the efficiency, activity, and health of human workers under different geographic conditions. Excellent examples are Huntington's stimulating studies of the influence of changes of weather and climate ("Civilisation and Climate," and "World Power and Civilisation").

CONCLUSIONS.

The scope of geography is wide, its aims lofty and its methods scientific. Its scope is, indeed, so vast that each of several sub-divisions engage many investigators. Its aims are so far-reaching that they cannot be easily or promptly accomplished, but that does not decrease their desirability. In method, geography stands between the descriptive sciences and the experimental, partaking of both. Hence, elementary geography provides an advantageous introduction to either group, as well as being of special educative value itself, particularly in the training for citizenship. Research in geography varies in difficulty and value, most phases comparing with most research in other sciences. The working out of the influences of man's earth environment, however, is one of Science's most difficult and important problems.

Burma. Sir Herbert Thirkell White. 13½ x 20 cm., pp 226. Camb. Univ. Press Provincial Geographies of India Series. Edited by Sir T. H. Holland. 1923. 8/6.

Sir T. H. Holland writes in his preface: "Whether the Government of Burma remains under the Governor General of India or becomes answerable direct to the King-Emperor, the Province must necessarily remain a geographical and political, as it is a distinct ethnological unit—a Burmese nation." Sir Herbert White has lived and worked for 33 years in the province, and has been in intimate touch with Burmese life, and his book bears evidence of this on every page, yet his chapter on "the people" seems singularly unreal and remote, especially to those who know Fielding's "Soul of a people." The descriptions of the flora and fauna are valuable, and the full scientific names are given in every case. There are numerous illustrations and a folder map, which gives no indication of build and has no scale. This is unfortunate, as the divisional boundaries, divisional headquarters, and so on, would gain much in value if shown on their physical setting. There is a most useful general bibliography, a valuable appendix giving the 1917—1920 rainfall at various stations in Burma, another giving recent alterations in the administration of the Shan States, and one noting the more important changes in the trade statistics for 1921—2, amongst which may be noted the remarkable decline in imports and rise in exports, the decrease in imported salt from Germany, and the fact—eloquent of food difficulties in Germany—that she took 217,000 tons of rice.

SOME GEOGRAPHIC FACTORS IN AMERICAN EXPANSION.

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ESSENTIAL to an understanding of the economic development of the United States is the realization that this development has involved the westward expansion of a people across a continent. It is significant not only that there has been constant expansion, a fact which undoubtedly has been important in moulding American institutions and in shaping American character, but that this expansion has been westward. North America, unlike South America, was settled from the East. To this generalization there are exceptions: there was early French penetration into the Mississippi valley from the North; the Spaniards entered the Gulf region and the lower Mississippi from the South, and Spanish settlement extended northward from old Mexico into California. But it remains true that the front of continuous settlement, that is the front of Anglo-Saxon settlement, advanced in general westward. In order to appreciate the importance of this fact, it is necessary only to consider, for example, how different would be the modern industrial status of New England, had that region not become a focus of English settlement long before the spread of population had opened the richer lands beyond the mountains to the west.

It results from this westward spread of settlement that successive stages of economic development have followed each other in rapid procession across the continent from east to west. First went the individual explorers, traders, trappers, and hunters, who marked out the ways and blazed the trails. Then followed, in turn, the herdsman, the agriculturist, the manufacturer. From this sequence there were, of course, many departures. One or another of these stages of development was omitted in certain sections of the country, and some regions passed through steps not included in this cycle, stages in which forestry, for example, or mining, was the dominant interest. Not all parts of the country, moreover, have by any means completed this evolution. But, in general, this has been the history. It is as true economically as it is geologically, that there is in North America an older East contrasted with a newer West.

It was not until the close of the last century that there ceased to be an American frontier. The 17th century frontier was at the Fall Line, the western border of the Atlantic Coastal Plain. Until the middle of the 18th century it was marked by the Alleghanies. By the early 19th century it had advanced to the Mississippi. With the discovery of gold in California in 1848, the frontier shifted to the Pacific coast. The border of the western arid region, upon which settlement has gradually been closing in, constituted the last frontier.

As the first English settlements were planted along the eastern rim of the continent, those of the North soon took on a very different character from those of the South. South of New York the Atlantic is bordered by a coastal plain, increasing in width southward. North of New York the eastern highland belt extends to the coast, with only local lowlands, such as the Boston Basin or the Connecticut Valley, developed here and there in areas of relatively weak rock. Further, the northern portion of the coastal belt was glaciated; that south of Long Island was not. It results that the rivers of the South, especially in that portion of the plain where the lower reaches of the streams have been drowned by coastal depression, were navigable for the boats of Colonial days considerable distances inland, and were bordered by fertile alluvial flats. On the rivers of the North, navigation was, in most cases, interrupted near the coast by falls or rapids; these streams, with a few exceptions, occupied young valleys, and were not bordered by alluvial lowlands.

Further, the rough surface and harsh climate of the North were not very favourable for agriculture, though cereal culture was practised. There was an early tendency to supplement agriculture with commerce and manufacturing. The fertile soil and warmer climate of the South made it an area suitable for such crops as cotton and rice and tobacco. Because of the ready market for tobacco in Europe and its relatively high value in proportion to bulk, tobacco became the leading crop of Maryland, and part of North Carolina.

Now tobacco culture demands a considerable amount of labour, which in the warm climate of the southern colonies was highly unpalatable to the cavalier English who settled in that region. Tobacco culture furnished the basis for the introduction of negro slave labour. The cooler northern climate, the tendency toward commercial and industrial rather than purely agricultural activities, left little room for the negro slave in New England. In the North slavery became unpopular chiefly because it was unprofitable there.

The North thus became a region in which agricultural holdings were cultivated by the farmers who owned them, and were necessarily small; a district in which agricultural interests early became subordinated to commercial and industrial ones; a region where partly because of commercial and industrial tendencies, the unit of settlement was the town, with all the interactive, co-operative, community life which this involved; finally, a country in which, since rivers could not serve as adequate routes of communication, the development of roads and other facilities for transportation was essential. The lowland South, on the other hand, became an area in much of which large agricultural holdings extended along the rivers, holdings owned by aristocratic landlords and cultivated by slave labour; a region in which agriculture remained dominant, in which the farm or plantation, not the town, was the unit of settlement, and in which, because of the ease with which rivers could be utilized for transport, little effort was made to build roads or otherwise improve means of communication. These differences, which had already arisen in the days when the colonies were still confined between the Piedmont and the sea, were in some measure preserved as the population spread, more or less along latitudinal lines, westward. To understand the present distribution of American industries, one must remember not only the contrast between the older East and the newer West, but that early developed distinction, which persists in part even to-day, between a more industrial, progressive, free-labour North, and a more purely agricultural, aristocratic, conservative, slave-holding South.

When settlement extended west of the Fall Line, a pronounced contrast also developed between life on the southern coastal lowland and in the hill country of the Piedmont Plateau. The Piedmont was settled after 1720 in large part by Scotch-Irish immigrants, who, leaving the home country as a result of Parliamentary measures which damaged their textile industries, arrived in Philadelphia in large numbers between 1730 and 1775. They were poor, and, moving into the almost unoccupied Piedmont upland, they obtained small holdings, produced wheat and oats and corn chiefly for home consumption, and gave considerable attention to the raising of live stock. There was no need for slaves on the small hill farms of the Piedmont. Between the slave holding tobacco and rice planters—the English aristocracy of tidewater Virginia and South Carolina, and the slaveless small farmers, the Scotch Irish cereal growers of the western portions of these States, there existed a natural difference of political viewpoint. Sectional political antagonism made Virginia for years a "house divided against itself."

The Appalachian barrier was a powerful factor in keeping the colonies for more than 100 years confined to the hem of the continent. But in the latter part of the 18th century, and especially after the War of Independence had snapped the ties which bound the colonies to England, colonists began to spread through the passes in the mountain barrier into the fertile country beyond, which stretched toward the Mississippi. It is interesting to note that New England, for all its progressiveness, was not a leader in the earlier trans-Appalachian migration. The chief reason lay in its commercial and, later, its manufacturing interests, which bound most of the population firmly to the Atlantic seaboard. The first tide of westward migration flowed chiefly from the agricultural South, where land was constantly being made unproductive by wasteful one-crop farming, where new land was ever in demand, and there was thus a motive for the " press toward the West " policy. It was, therefore, that portion of the interior south of the Ohio which was first settled extensively.

The location of early settlements in the trans-Appalachian country was determined by these chief factors: nearness to water courses, which provided the only ready means of communication, soil fertility, and nearness to supplies of salt. Among the regions earliest settled were the fertile Blue Grass region of Kentucky, still famous for its high bred stock, and the crest of the Nashville Dome in Tennessee. In each case, outcropping limestone and limey shales formed rich soil ; the Ohio and Cumberland rivers afforded water highways ; and in Kentucky there were numerous salt springs.

The advance of settlement beyond the Appalachians involved the conquest of a wilderness. Except for the Illinois Prairie, almost the whole of the country east of the Mississippi was densely forested. Because of the wooded character of most of the region, this area, which was practically devoid of natural pasture land, never passed through a purely pastoral stage. The agriculturist followed close upon the hunter,—or, indeed, the two were combined often in the same person. The frontiersman crossed the mountains, chose a fertile spot in which to settle, made a small clearing in the forest, and erected a log cabin. Then he hunted game and Indians, while he gradually extended his clearing and converted it into agricultural land. But, although this region never passed through a purely pastoral stage, the tendency for stock raising, a typical frontier industry, to develop was none the less apparent. The only markets at which the frontiersman could sell his produce in exchange for the tools, utensils, guns and ammunition, and other articles he needed, were, for a time, to the east, beyond the mountains. Across the Appalachian highland there is one broad and easy passageway—the Hudson-Mohawk Gap. This route, however, lacked in the early days of trans-Appalachian settlement the tremendous importance it has won in later years, for the reason that the early population centres of the Interior were chiefly south of the Ohio. For them the Mohawk route was too far North, and traffic was forced to follow the more difficult passes farther south. Since stock could walk to market, the frontiersman fed his surplus corn to hogs and cattle, which he drove over the mountains by easy stages to markets in the East. The famous " Wilderness Road " through Cumberland Gap, followed by many settlers on their way west from Virginia, came to be known as the " Kaintuck hog road " in the backwoodsman's language of that day.

The frontiersman had the alternative of making his corn into whiskey. A pack animal could carry only four bushels of corn, but the equivalent of 25 or 30 bushels made into whiskey. It is not surprising that the inhabitants of Western Pennsylvania and Kentucky in 1800 regarded the excise tax which the government imposed on whiskey with almost as much indignation as the Bostonians of 1775 expended upon the famous British import tax on tea.

This first period of western settlement was, indeed, a critical period in the history of American unity, because the East remained for a time perhaps wilfully blind to the economic needs of the Interior. The natural outlet for the produce of this region was south by way of the Mississippi rather than east across the mountains. It is eloquent of the importance of the Appalachians as a barrier that ocean going boats were built at Marietta and other points on the upper Ohio, which carried produce down the Ohio and Mississippi and sold it on the eastern coast. An interesting example is the "Monongahela Farmer," a boat built east of Pittsburg, at McKeesport on the Monongahela, which carried flour down the Mississippi, around to the eastern coast, and sold it in Philadelphia. Trouble arose from the fact that before 1803 the land west of the Mississippi and at the mouth of the river still belonged to Spain, and Spain from time to time denied the Americans free use of the river. The long delay of the United States Government in making a satisfactory treaty with Spain assuring the free navigation of the Mississippi, threatened, more seriously than is perhaps generally realized, to sever the country west of the mountains from the Union, and unite it with a European power. This is significant as indicating the economic dependence of this area upon the Mississippi outlet. The purchase by the United States in 1803 of a large area west of the river at once relieved this danger, and encouraged the increased settlement of the Interior.

In 1820 there were 2½ millions of people, quarter of the total population of the country, west of the Appalachians. By 1840 the population of the Interior had increased to 6⅓ millions. One of the very important factors in promoting increased settlement during these years was the extensive development of steam navigation on the rivers of the Mississippi system and on the Great Lakes. The first steam boat appeared on the Ohio river in 1811 and on Lake Ontario in 1816. By 1830, 230 steamboats operated on the Mississippi and its tributaries; by 1848, 1,200. Accompanying the increase of numbers was a great improvement of the boats used, which reduced tremendously the time, the cost, and the danger of transportation. Thousands settled along the rivers of the central Interior having steamboat service, while steam navigation of the Lakes after 1830 was the largest single factor in promoting spread of settlement in northern Illinois and southern Wisconsin and Michigan. Pittsburg, Cincinnati, St. Louis, and New Orleans became thriving river centres of the steamboat trade; the lake commerce of Buffalo, Toledo, Cleveland, Milwaukee, and Chicago gave these cities their first substantial growth. The present insignificant use of the Mississippi system for navigation gives little suggestion of those pre-railroad days, when the rivers of the Interior carried an annual commerce of hundreds of millions of dollars—the period of which Mark Twain writes that "the one permanent ambition" among the boys of his Missouri village "was to be a steamboat-man."

Another important factor in the increase of population in the Interior after 1820 was the rapid spread of cotton cultivation. Cotton culture, established in the southern coastal plain in the Colonial period developed tremendously after the invention of the cotton gin and of power machinery for the spinning and weaving of cotton. The demand for additional land for cotton cultivation caused a spread of the southern planters beyond the limits of the Atlantic lowland. They invaded the Piedmont. Many of the early Scotch Irish settlers sold their farms and moved west. The economic divergence between coastal lowland and adjoining upland lessened. Virginia and South Carolina secured political unity. The cotton planters also spread round the end of the Appalachian barrier into the Gulf Coastal Plain.

Cotton culture, like tobacco culture, required much field labour but demanded little skill. It was adapted to slave labour. Slavery spread, with cotton, into the Piedmont and the southern Interior. Into the cooler lands north of the Ohio settlers from the more northern coastal belt carried northern ideas of owner cultivation and smaller farms. Cereal culture was not adapted, as was cotton, to save labour. Between the cotton kingdom and the corn belt there arose a contrast almost as sharp as that between tidewater Virginia and commercial New England. This divergence reached its climax in the Civil War.

The Louisiana purchase in 1803, which encouraged increased settlement of the eastern Interior, gave also a new impulse to further westward migration. Thus while forests were still being cleared, and compact agricultural settlement was being extended in the more favoured sections of the area between the Appalachians and the prairies, the traders, trappers, and hunters, who always went ahead were already marking trails across the grasslands to the wilderness of the Rocky Mountains. There were two chief motives which drew these forerunners of settlement across the continent. One was the fur trade of the North-west; the other was trade across the south-western plains with the Mexican settlement of Santa Fé.

In the years between 1803 and 1843 the north-west fur trade had an enormous development. St. Louis had been founded in 1764 as a fur trading post. Here parties were equipped with supplies brought up the Mississippi from New Orleans or down the Ohio from the East. Starting from here westward they followed the Platte or the Missouri across the semi-arid plains to the forests of the Rocky Mountains. By the close of the period there were 150 tributary posts at various points in the north-west which sent their furs to St. Louis to be dressed and salted for shipment to the East. Several large companies were organized for the conduct of the fur trade, and in the days of its prosperity there were many fortunes made.

That the fur traders of this period carried their operations not westward but north-westward from St. Louis was of significance. This choice of direction was due to several factors: the Missouri river afforded the best highway across the plains, and one of the fur trading companies introduced steam navigation on this river; the animals of the North were believed to have thicker fur, and hence to supply more valuable pelts than those farther south; the expedition of Lewis and Clark helped to direct American interest north-westward; the territory belonging to the United States at this period extended farther west in the north than in the south. The operations of the fur companies in the North-west, followed by the settlement of farmers who migrated in the wake of the traders, formed a partial basis for the American claim upon territory extending north to the parallel of 54°, 40′. There was precipitated the boundary dispute with England, which gave rise to the famous American slogan, "Fifty four forty or fight!"

The Santa Fé trade flourished during the latter part of the same period, from the time Mexico became independent in 1822, until the traffic was suspended by the Mexican government in 1843. Santa Fé was separated by so long and difficult a route from the Mexican port of Vera Cruz that exorbitant prices were paid there for all imported commodities. Americans discovered that they could undersell Vera Cruz in the Santa Fe market and still make a large profit. No large company ever engaged in the traffic, but hundreds of individual traders were involved. Setting out from St. Louis, or, later, from Kansas City, in groups large enough to reduce the danger from the attack of the Plains Indians, they carried textiles, drugs, tools, and trinkets of all sorts to the Mexican city. They brought back horses and mules, blankets and hides, and gold and silver money, which was always scarce on the frontier. This trade was effective in marking out the famous Santa Fé trail, which remained an important route to the South-west, and in preparing the way for the acquisition of this territory from Mexico.

The lines marked out by these first traders, permanent settlers were soon to follow. By 1843 a considerable emigration had begun of settlers from the Mississipi Valley, who followed the Oregon trail along the Missouri and the Upper Platte, crossed South Pass in the Rockies, and continued down the Snake and the Columbia to the fertile valley of the Willamette. It is perhaps not generally realized that, several years before the discovery of California gold, while California was yet a region of a few Spanish missions, and vast numbers of cattle and horses which grazed on its grasslands, an agricultural population had begun to settle in Oregon. It is not at once apparent what was the motive which led pioneers of the Mississippi Valley in the forties to leave a country where there was plenty of good land, and make a six months' journey of two thousand miles across mountains and semi-arid plain in order to arrive at a country the chief attraction of which was that there was plenty of good land again. There were many factors contributing to this migration,—the unsatisfactory status of the slaveless settler in Missouri, Kentucky, and Arkansas; sufferings from cholera and from "fever and ague" in the frontier towns of the Middle West; the desire to win territory in the North-west for the United States by settlement; the prospect for a very generous land donation law in Oregon; and, not the least element, perhaps, the sheer restlessness of the southern frontier stock. Undoubtedly a further reason was the difficulty of markets in the Interior. There was still no rail communication across the Appalachians. The Erie Canal through the Mohawk gap, served the Lake's district, but not the South. A vast region was tributary to New Orleans. The bringing of a large area rapidly into cultivation flooded markets. Surplus products often brought no price at New Orleans. Doubtless the settlers hoped to find access to Pacific markets on the western coast.

The discovery of gold in California in 1848 at once boomed the Oregon region, and brought a great flood of prospectors and settlers to California. Oregon farmers found in California gold seekers the market which they sought. The American frontier shifted to the Pacific coast.

The discovery of gold led to prospecting for gold and other metals elsewhere in the highlands which lay east of the frontier. Mining towns sprang up from time to time in the area between the Rockies and the coast, supplemented, where sufficient rainfall or local facilities for irrigation made it possible, by agricultural settlement.

In the area of grassland extending east from the Rocky Mountains to the western border of the forest, agricultural settlement came late. The frontiersman, who had advanced through the forest from the eastern coast, stopped short at the border of the prairie. Even east of the Mississippi in the prairie lands of Illinois, where rainfall is adequate and soil in most places is rich, settlement was relatively slow. The reasons were various. These woodsmen believed the treeless land infertile. They had no means of breaking the very tough prairie sod. The grassland afforded no shelter from cold winds, and scarcity of building materials was severely felt. In the region farther west there was the very real difficulty of scarcity of rainfall, coupled with lack of means of communication. The eastern part of the Great Plains is well suited for wheat culture, but has insufficient rainfall for a varied agriculture. Settlement based upon large scale production of a single crop is practicable only when transportation facilities make possible the marketing of that crop in exchange for varied products. The rivers of this semi-arid country are in large part unnavigable. Agricultural development necessarily awaited the coming of the railroad.

It was, indeed, on the border of the High Plains that the American farmer in his progress westward encountered his first great obstacle. Even after agricultural advance had been made into the region there were serious setbacks. The first settlers in western Gansas, Nebraska, the Dakotas, and eastern Colorado, entering during a series of unusually wet years, tried to produce wheat by the methods employed in the more humid East. They were starved out by hundreds of thousands in the dry years which followed the rains of the middle eighties. Millions of acres reverted to grassland. More recent advances into the region have been accomplished by the introduction of methods of dry farming. It is obvious why the Great Plains long remained, and remain in part to-day, in the pastoral stage of their evolution.

The grazing industry was introduced into the Great Plains from the South. Cattle had been brought early by the Spaniards into Mexico, and even before the Revolution there were cattle ranches north of the Rio Grande. By the middle eighteen fifties most of Texas was " a vast unfenced feeding ground for cattle, horses, and sheep." From here the industry gradually spread northward over the plains, and by 1880 it had reached the Canadian border.

After the Civil War, as railroads began to build across the plains, Texas cattle were driven northward and eastward to shipping points on the railroads, for transportation to eastern markets. Every year there was a great Texas cattle drive. The banner year was 1884, when one million cattle were driven out of the State. Many railroad towns in Kansas and Nebraska originated as " Cow towns," that is, shipping points for Texas cattle. These drives ceased, of course, with the penetrations of railroads into Texas.

The grazing area of the West was originally public land, owned by the government and known as the free range. Anyone might allow any number of animals to graze there without restriction. The range soon became overcrowded, deteriorated, and became in many parts better fitted for sheep than for cattle. Many sheep were introduced. Constant quarrels between cattlemen and sheepmen led to the gradual fencing and breaking up of much of the free range into separate ranches privately owned.

The coming of railroads meant also an advance of the agricultural frontier. After 1875 people began to move west into the plains of Kansas and Nebraska, and grow wheat for export. The establishment of a bonanza wheat farm in the Red River Valley in 1875 was followed by a great rush to the wheat lands of the North-west. Once settlement had begun there it was amazingly rapid. The Northern Pacific railway was completed to the coast in 1883. Minneapolis came rapidly to the front as the foremost flour milling city in the world.

Since the advance of agriculture into the less dry portions of the Great Plains, many scattered agricultural areas have developed in the drier lands of the West by means of irrigation, both by private enterprise and by large government projects, which have opened up great tracts to cultivation. This work will be extended, but a great area must permanently remain either grazing land or arid desert. With the closing of settlement about the arid region there ceased to be an American frontier. A very important chapter of American history was thereby closed.

American agricultural development has now reached that critical stage in its history when there is, in the United States, practically no more immediately potential agricultural land available. There are approximately five hundred million acres of improved land. To this total, three hundred million acres, in part of inferior quality, can possibly be added by drainage, irrigation, dry farming, and utilization of certain stony unimproved pasture lands, when economic conditions are such as to make this reclamation profitable. While present prices of farm products maintain, the costs of much of this improvement are prohibitive. The conditions of future extension of farming settlement must contrast sharply with those which attended the original agricultural occupation of the country in accordance with the westward expansion of its people.

Important sources from which facts used in this brief summary have been borrowed freely are:—

1.—Unpublished lectures of Professor H. H. Barrows of the University of Chicago, on "The Influence of Geography on American History."
2.—Semple, E. C.: "American History and its Geographic Conditions."
3.—Turner, F. J.: "The Significance of the Frontier in American History."
4.—Salisbury, Barrows, and Tower: "Elements of Geography."

Evolution and Progress of Mankind. H. Klaatsch. 316 pp, 26.5 x 17 cm. 112 illustrations. London: T. Fisher Unwin, 1923. 25/-.

This is an interesting statement of the views, in parts very strange views, of the late Professor Klaatsch on the origins of mankind and of human races. The author upheld the theory that mankind had several origins, and that we must look for the diverse animal ancestors of diverse human types, not among the anthropoid apes, but among the lower relatives of the apes. This position has been criticised, and one may say destroyed, by such work as that of Giuffrida-Ruggeri and others, and it need not detain us further. He was an anatomist seized with the idea of Darwinism, and anxious to apply it in modified form to man, and his enterprise gave him a share in the unearthing of some interesting prehistoric remains. Some doubts have been expressed about some of his reconstructions of early skulls, but here it may be claimed that subsequent study is revealing the importance of a type very near his reconstruction of the Combe Capelle skull. The book lacks maps, and is weak on the geographical side, but it has its value as an exposition of an interesting position in a controversy still far from closed.

Canadian School Geography. 19½ x 13 cm. **Canadian School Atlas.** 29 x 22 cm. G. A. Cornish. Dent and Sons, 1922.

These books are not, as their title might lead one to suppose, studies of Canada. The text book is one of general geography of a standard roughly corresponding to the type of text book used in this country by forms preparing for the first public (school) examination. Its value to Canadian scholars is, however, that it is written by a Canadian, and therefore emphasises the geography of Canada itself, seven out of the forty-eight chapters being devoted to the homeland. The atlas has been prepared for use with the text book by the Edinburgh Geographical Institute under the direction of Mr Cornish, and the relief maps of the various regions should be most useful. One cannot, however, but regret that more use has not been made of the "Atlas of Canada," so well known as a work of reference. A vegetation map, for example, based on the forests map of the Reference Atlas and correcting the wall maps of vegetation in general use would have been welcome. It would have been valuable to show the geology also, and we should like a series of maps showing the progressive bringing under cultivation of the respective provinces, the development of roads mentioned in Sec. 278, and so on. Two of the most notable omissions in the text book are, first, the omission of any mention of the study of large scale maps of the scholars' home region, and, second, the lack of any attempt to break away from the old tradition of treating political units as geographic entities. But the book has many valuable points, and English teachers will find much in it that is suggestive and useful. It is profusely and clearly illustrated, and we are glad to note that the economic maps are prepared on the stippling principle, and that maps useful for comparisons are placed side by side on the same page. The book contains numerous "projects" which will undoubtedly set scholars thinking, as will such questions as those on p. 397 under the illustrations there given. There is a good index, with a useful key to pronunciation. The book is entirely up-to-date as regards the new political divisions of the world since the close of the late war. Mr. Cornish is to be congratulated on having made a pioneer effort towards emancipating Canadian schools from their dependence on text-books written for children of other lands, for to quote his own worods, "to adapt or make over such a book for another country quenches its fire," and certainly a country so full of potentialities as Canada should be able to produce geographers ready to write of it with the familiarity born of years of study of their native land.

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PROGRAMME OF SUMMER TOURS, 1923.

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The Association's Conducted Tours are rapidly filling up, and Members or friends are asked to apply for places on the tours that are still available, as early as possible, in order to avoid disappointment. There are vacancies on the following Tours:—

Tour No. 2. July 28th to Aug. 4th (inclusive). Starting from BRADFORD.

(3 vacancies). Conducted by W. H. BARKER, Esq., and E. E. LUPTON, Esq., F.R.G.S.

The English and Scottish Lake Districts, &c.

1st Day.—Bradford, Aire Gap, Ribblesdale, Lonsdale, Grange-over-Sands, Windermere, Ambleside.
2nd Day.—Rydal, Grasmere, Thirlmere, Derwentwater, Borrowdale, Keswick, Carlisle.
3rd Day.—Gretna Green, Annandale, Clydesdale, Glasgow.
4th Day.—Loch Lomond, S. Highlands, Lake of Menteith, Callander.
5th Day.—The Trossachs, L. Katrine, Stirling, Bannockburn, Edinburgh.
6th Day.—At Edinburgh till 3-0 p.m., thence to Galashiels, Melrose, Kelso.
7th Day.—The Cheviots and Border, Northumberland Coast and Plain, Alnwick, Tyneside and Durham.
8th Day.—Teesdale, North Yorkshire and the Yorkshire Dales.

Tour No. 3. Wednesday, Aug. 8th to Wednesday, Aug. 15th (inclusive). Starting from BRADFORD.

Conducted by E. S. PRICE, Esq.. Ruabon County School.

The Natural Regions of Central and South Britain
(including the MARCHES OF WALES).

1st Day.—The Pennines, Chester, Llangollen, Shrewsbury.
2nd Day.—Welsh Border, Ludlow, Hereford, Ross-on-Wye.
3rd Day.—Lower Wye, Tintern, Chepstow, Gloucester, Cotswolds, Bath.
4th Day.—Mendips, Cheddar, Wells, Sedgemoor, Yeovil, Dorset Downs, Bournemouth.
5th Day.—New Forest, Winchester, Bagshot Heath, Windsor.
6th Day.—Stoke Poges, Henley, Chilterns, Thames Valley, Oxford.
7th Day.—Aylesbury, Bedford, Huntingdon, Fenland, Peterborough.
8th Day.—Midland Plain, Nottingham, Dukeries, S. Yorkshire.

Tour No. 4. August 18th to August 25th (inclusive). Starting from BRADFORD.

The English and Scottish Lake Districts, &c.

Conducted by G. A. GERMAN, Esq., M.Sc., F.G.S.
Similar to Tour No. 2. Open to Members and friends at fares quoted below.

FOREIGN TOURS.

Tour No. 5 **With the kind assistance of Members of the Alpine Club and others, the following tour in Switzerland has been specially arranged.**

22 Days Regional Tour to The Bernese Oberland.

August 8th to August 29th. 2nd Party (First Party is complete).

Conductors:—Members of Swiss Alpine Club.

Synopsis of Route—

1. London, Dover, Calais, Bâle, Lucerne (two nights at Lucerne). Visits to Glacier Garden, Cathedral and Old Lucerne, and a full day Lake Excursion to Fluelen and Tell's Platte.
2. Journey by Boat and Mountain Railway to Engleberg (five nights).
   Excursions (optional) to:—(a) Professor's Walk and Eienwalchen.
   (b) Arri Alp and Zwingen Alp.
   (c) Surenen Pass.
   (d) Titlis.
3. Walk via Jock Pass to Innertkirchen (two nights). Visits to Handegg Falls, Aar Gorge and Reichenbach Falls.
4. Walk via Grosse Scheidegg to Grindelwald (five nights).
   Excursions (optional) to:—(a) Baregg Hut and Lower Glacier.
   (b) Day at Interlaken.
   (c) Faulhorn or Jungfrau Jock.
   (d) Lutchine Gorge and Ice Grotto.
5. Walk via Kleine Scheidegg to Lauterbrunnen (two nights). Visit the Upper Lauterbrunnen Valley to Trochsellauenen.
6. Walk (directed by Guide) over Tschingel Pass to Kandersteg (4 nights).
   Excursions (optional) to:—(a) Borderspitz.
   (b) Œschinen Lake and Blumlis Alp.
   (c) Head of Gemmi Pass.
7. Return via Berne, Paris and Calais.

The walks are not too strenuous and are well interspersed with easy days, when walking is entirely optional. All the longer pass walks may be obviated by taking train if desired. At each centre and en route, addresses and lectures will be given in explanation.

A detailed itinerary and full particulars of this tour may be obtained from Miss L. Lee, F.R.G.S., 'Melford,' Walpole Road, Boscombe, Bournemouth.

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N.B.—The above fare is subject to the party numbering at least 25; if less than that, one guinea more will be charged.

Tour No. 6.

14 Days in "The Paris Basin," etc.

August 1st to August 14th (inclusive).

Conductor:—MISS S. HARRIS, F.R.G.S.

(Assistant Lecturer in Geography, Univ College of Wales, Aberystwyth).

Synopsis of Route:—

1.—London, Newhaven—Dieppe. Train to Paris.
2.—Two full days in Paris. Motor coaches to surrounding districts.
3.—Train to Avallon, with visits to Semur, Dijon, Beaune.
4.—Motor Coach, Avallon to Tours or district near.
5.—Train to Paris, with visits to Chartres and Versailles, etc.
6.—Train to Rouen and Dieppe.
7.—Steamer to Newhaven and train to London.

INCLUSIVE FARE:

Members, 17½ guineas. Non-Members, 18½ guineas.

This fare only applies if the party numbers at least 25. If less than this one guinea more is charged per head.

The fare includes 2nd Class travel by Train, 1st Class on Steamers and Motor Coach conveyance; Hotel Accommodation and Meals at excellent Hotels; all gratuities at Hotels; Kurtax and services of Conductor.

For further particulars of this Tour apply to Miss S. Harris, Dept. of Geography, Marine Terrace, Aberystwyth, or to Mr. E. E. Lupton, 73, Bierley Lane, Bradford. (Enclose stamped envelope for reply).

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1. The number of passengers on the British Tours is limited to 24 per tour, and bookings are accepted in strict order of application. Each tour will be accompanied by a Lecturer, who will give his services in indicating and explaining all the interesting Geographical problems, etc., met with en route.
2. Every care will be taken to ensure the safety and comfort of the Members, but it must be understood that no liability whatsoever is accepted by the Committee for loss of tickets, luggage or other property; nor for personal injuries or sickness occasioned by accident, weather, detention or any other cause.
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7. If, owing to unforeseen circumstances, a tour should be abandoned by the Committee, all payments will, except where otherwise stated, be returned in full.
8. Members who have urgent reasons for withdrawal may generally do so, except where otherwise stated, up to within one month before the tour commences for which entry has been made. If a substitute can be provided the deposit may be returned in full. Otherwise a fee of 10/- will be retained for cancellation expenses.
9. Intending passengers are asked to communicate as follows:—

   (a) For further particulars and itinerary of the Swiss Tour to

   Miss L. LEE, F.R.G.S., 'Melford,' Walpole Road, Boscombe,
   Bournemouth.

   (b) For particulars of the British Tours, etc., and **ALL BOOKINGS FOR ALL TOURS** to **Mr. E. E. LUPTON, F.R.G.S.,**
   73, Bierley Lane, Bradford, Yorks.

   (Enclose stamped addressed envelope for reply).

Legendary Islands of the Atlantic. W. H. Babcock. 19½ x 12½ cm., 196 pp. American Geographical Soc. Research Series. No. 8. 1922. 3½ dollars.

This book contains some chapters which have been based on articles by the author published in the "Geographical Review" from time to time. Others are quite fresh, and those who have read the articles with interest will be glad to have this general review of the author's studies in mediæval geography.. There are 25 maps, and the numerous bibliographical references bear witness to the wide background of study on which the book has been written. There is a brief introduction, giving a table of the various entrants upon the exploration of the Atlantic. This inevitably suffers from its extreme compression, but yet is very valuable, especially in its comments on Irish sea rovers, whose influence is too often ignored in such summaries. Among the main islands dealt with are Atlantis, "Brazil," the Island of the Seven Cities, Mayda, Corvo, and the sunken land of Buss. The main conclusions of the author are that Atlantis was entirely a creation of philosophic romance; that though St. Brendan did not cross the Atlantic, nor discover any island in its remoter reaches, yet he seems to have visited many eastern Atlantic islands, and that the 14th and early 15th century portolan maps which link his name with Madeira are substantially correct. For "Brazil" and Mayda the problems are stated, but not solved. There are interesting and detailed identifications for the Norse discoveries in America, and the author thinks that Portuguese maps reporting islands in the West Indies probably gave an impetus to Columbus. The scientific spirit in which the various legends have been discussed is an interesting example of the value of such work in getting the best out of our wealth of folk lore.

IRISH GEOGRAPHICAL ASSOCIATION.

Abstract of a lecture by Sir Walter J. Buchanan, M.D., K.C.I.E.,
on 13th April, 1923.

THE GEOGRAPHICAL DISTRIBUTION OF DISEASES.

THE lecturer first pointed out that as disease is a morbid process it might not be strictly accurate to speak of its geographical distribution, but as a large part of the more important diseases which affect men and animals are due to parasites, great and small, animal and vegetable, it is correct to speak of the distribution of those parasitic "causes," and consequently of the diseases they produce.

The story of the distribution of diseases is a study therefore of the "causes" of diseases, and of the geographical conditions which influence those "causes." For example in discussing Malaria we have to consider not only the parasitic cause, but also the various species of mosquitoes, and the varied conditions of heat and moisture, rainfall, season, drainage, etc., under which the mosquitoes live.

Some diseases are practically, or potentially, universal; others are local; others flourish mainly in cold or in warm climates. Much work has been done within the past thirty years which has added enormously to our knowledge of what are called usually "tropical" diseases, but the number of those which are confined literally to the regions of the "tropics" are but few and relatively unimportant, e.g., *mycetoma* and *ainhum.* So called "tropical diseases" are those which mainly flourish in the warmer climates.

It must here be pointed out that many diseases now prevalent did not formerly exist where they now are found, for example, it appears certain (v. *Cambridge History of Ancient India,* vol I.) that malaria did not prevail in the Punjab and Baluchistan in the days when Alexander the Great with his huge and motley hosts invaded those countries; but at the present day no such army in those regions would fail to encounter malaria and cholera.

Moreover, within the last forty years, we have had two examples of the virulent revival of two great epidemic diseases which had been virtually forgotten, viz., Plague and Influenza.

Sleeping sickness, which is the terminal phase of a trypanosome infection, is a good example of a strictly limited disease; its limitation depends upon the distribution of the *tsetse* fly, (*glossina palpalis*), which is fortunately confined to certain "fly belts" in central Africa.

Other diseases know no limits of latitude or longitude as, for example, tuberculosis, leprosy, or measles. On the other hand a disease, in some respects akin to measles, viz., scarlet fever, is confined to temperate climes and though fairly often introduced, by means of infected clothing or woollen stuffs, into India, it has never 'caught on' and spread there. Hookworm (or *ankylostomiasis*) is an extremely widespread infection which prevails "from China to Peru," it is mainly 'tropical,' but under certain artificial conditions, which reproduce the necessary factors of heat, moisture and absence or imperfection of conservancy methods, it has been introduced and has played havoc with communities of men working together in sub-Alpine tunnels and deep down in Cornish mines.

Seasonal variation is an aspect of geographical control which must be considered. At first sight it is of importance, but on consideration it is less so. Plague and cholera have undoubted "seasons," but their prevalence at these periods depends less upon season *per se*, than upon the changed conditions of life brought about by season. Both rise to a maximum prevalence towards the end of the "cold weather" in India, but in case of plague this is mainly due to the fact that in the hot weather people live and sleep out of doors, and are consequently brought much less in contact with the "domestic" rat and the rat-flea (without which there is no spread of bubonic plague), than in the cold weather when people crowd into their houses or huts, where the rat and the rat-flea have easy access to them. In the case of cholera towards the end of the dry cold weather water supplies are less, and so more easily polluted.

Altitude above sea level is another geographical factor of some importance. Temperature decreases, roughly, about 1° F. for every 300 feet ascended above sea level; for example the average yearly temperature at Colombo, on the sea coast of Ceylon, is about 80° F., whereas 6,000 ft. up at Newera Elia in the hills close by, it is only 58° F. This elevation brings us above the level of mosquito prevalence, consequently above the reach of mosquito-borne diseases, such as dengue or malaria.

Racial susceptibility is a factor not so important as was once thought. In the tropics at least, differences of race connote differences of habits, modes of life, environment generally; as well as differences in the degree of acclimatisation, and in the amount of exposure to infection, so that when those are discounted there is but little left for 'race' *per se*. Some examples seem to qualify this statement. For instance the susceptibility of those fine soldiers of the Indian Army, the Gurkhas, to many forms of epidemic disease is a notorious fact, but when we consider that in the plains of India the Gurkha soldier, born and bred in the Nepâl Hills, is practically a stranger and new-comer, it is clear that his undoubted susceptibility is rather analagous to the well known susceptibility of all races to new diseases of which they have no ancestral or racial experience, of which there are many examples, as in the case of measles, which ravaged the Fiji islanders and the pygmy inhabitants of the Andaman Islands, when first accidentally introduced from without. A recent example of this, in fiction, is the epidemic which attacked Mr. H. G. Wells' Utopians on the arrival of the Earthlings; (v. his new book *Men Like Gods*). It may be answered that the white races are specially prone to malaria, but we must remember Koch's statement that adult natives suffer less, only because they have been frequently attacked in childhood, have survived, and attained to some degree of immunity.

Another example may be mentioned, the exemption of the white races in India from filariasis resulting in elephantiasis. This infection is conveyed by a very common mosquito which impartially bites all races, white or black, but the exemption of the white man here is probably only a numerical one, that is, even in the most infested east coast of India the number of white men is extremely few, among the myriads of the native inhabitants of that coast.

The lecturer then went on to sketch the widespread prevalence of certain great diseases, such as influenza, cholera and leprosy, and treated of their history and their recent prevalence. Influenza is one of the oldest of known diseases, but as has been said, had been practically forgotten up till the recent revival of so called "Russian" influenza in 1889, which in a few weeks or months spread over the whole world. Cholera is another such disease and though it is an old disease in India, it first became known only in 1817 and spread widely to many parts of Europe and Asia, and it is to the havoc and fear caused by cholera in "the thirties" that all our modern sanitation is due.

Leprosy is a very old disease, well known now to Europeans chiefly from descriptions of it in the Old Testament, where, however, it is undoubtedly confused with other skin diseases, notably with white-skin or *leucoderma*, a harmless but very disfiguring skin disease, especially among dark skinned peoples. Leprosy was very prevalent in the Middle Ages in Europe, and is still found in isolated cases in many countries of Europe, but its chief centres nowadays are Japan, China and India (a very recent statement by an expert is that not less than one million cases exist in India).

Plague is another ancient disease, and is one which was almost forgotten till the year 1896. The germ produces an epizootic in rats, and it spreads from rats to man by means of the rat-flea. The present prevalence has been traced to an endemic focus in China, and it spread rapidly from Canton and Hong Kong to many parts of the world, and in this year it seems to be as bad in India as ever it was.

It is clear then that the geography of disease must in many cases be determined by that of the particular animal or organism which 'causes' or conveys the disease. In most cases there are three essential factors, viz., the parasite, the human subject and the extra-corporeal host. So the influence of external or geographical conditions must be complex, as such influences act not only on the parasite and the human subject, but also depend on the numbers and activity of the particular animal or insect which serve as the extracorporeal host.

For Bibliography see:—
(1) Clemow, "The Geography of Disease." Camb. Univ. Press, 1903.
(2) Hirsek, "Geographical Pathology." Sydenham Series, 1908.
(3) Manson, "Tropical Diseases." Newest Edition. Cassell Co.
(4) Castellane, "Diseases of the Tropics."

Land and Land Conditions in Kenya. 25 pp, 25 x 19 cm. Land Department, Nairobi, 1922.

This publication of the local government is interesting in view of the difficult situation in Kenya. There is a useful summary of gazetteer information about the country. Nairobi, the capital, has 3,000 Europeans, 9,000 Asiatics, and 12,000 Africans. Mombasa has 650 Europeans, 8,000 Asiatics, 5,000 Arabs, and several thousand Africans. The population of the country as a whole is not given. A very significant point is that while the area of Kenya is given as 245,060 square miles, there is a statement that the African population is for the most part located in reserves, covering in the aggregate 31,250 square miles, i.e., a little more than one-eighth of the country. This proportion is hardly a generous one, and in other parts of the report one gets a glimpse of labour difficulties, which are not surprising. Indeed, it would seem that there are few regions of the world for which there is such need of impartial study aiming at framing a policy for the future; the student cannot but feel that there has been too much haste and too little thought, and that the question as to whether it can be a white man's country in any real sense is not at all settled.

The Making of Rural Europe. Helen Douglas Irvine. 224 pp., 20.5 x 13.5 cm. London: G. Allen and Unwin. 1923. 7/6.

This book, written with some vivacity and considerable reading of the history of land tenure, is written by an author enamoured of the healthy ideas of production for use rather than for sale, of pride in well tilled fields held from father to son, of policies which make for the maintenance of a moderate but sturdy rural population, and of many other plans unfortunately too little heeded in our day. England has become a factory, a market, and a pleasure ground, and shows signs of losing part of the first of these functions, and of specialising as a stock and share market and a pleasure domain of the great financiers. The authoress tries to hint at remedies, but has little to say that can help us unless our mood changes. The earliest part of the book treats of the mediæval system, survivals of the large household and other forms of collectivism, latifundia, servile peasants, tenant farmers, small owners, wage-earning labourers, rural syndicalism and agricultural co-operation. Its key-note is the repeated phrase the "Green Rising," with the seizure of land by the peasantry and the expropriation of landlords, a phenomenon that was highly characteristic of the zone west of Russia at the end of the late war. Whether the Green Rising is really still in progress or whether we are not now rather in reaction against its weaknesses due to want of capital and of skill, is a question the future alone can answer. The book could have been enriched by a more geographical treatment, and less "tendencious" discussion of the social problems involved. The statements about wages on p. 173 should have been revised, at whatever cost to the publishers, in view of the present pitiful state of wages for farm work in many parts of England. Frederick the Great died in 1786, and this makes a correction necessary on p. 110. A number of slips gives an uneasy feeling to the reader who has not the time to verify the details throughout.

GLOUCESTER.

F. T. Howard.

THE position of Gloucester at a crossing point of the Severn was known long before Roman times. Chellean flints have been found near the better known fords of Worcester, Gloucester and Portskewett.

Later, Stone Age men and the metal workers left numerous remains to the east on the Cotswold plateau and to the west about the Forest of Dean—the Gloucester crossing connected these areas. These peoples were not concerned only with the mining of iron ore; the settlements of the Cotswolds suggest avoidance of the Severn Valley swamps, bogs, and unproductive country, in favour of the heathlands and forest clearings—a life of agriculture and hunting. Gloucester, too, may have been their fishing station, for the river was ever famous for its salmon, lampreys and eels.

At any rate, the Romans found a people in possession, the Dobuni, with Cirencester as their capital, civilized sufficiently to be using a gold coinage. Before A.D. 50 the Romans held them in subjection.

But history records how the people west of the Severn, the Silures, resisted many years. The Forest of Dean ironfield was worth fighting for. Scrappy evidence, such as can be drawn from the size and characteristics of camps, monuments, and brief records, suggests a simultaneous attack upon them from various points—one from the Mendips by Uphill near Weston-super-Mare, to near Cardiff and on northwards by Gelligaer; the second by way of the Bath-Redwick crossing to Portskewett and Caerleon; the third by Cirencester and Gloucester. It is worth remembering that the Romans were not good sailors. The first crossing lay by the two islands, Flat Holm and Steep Holm, affording protection from wind and current; the second is a traditional crossing which ebb tide converts from a waterway, The Shoots, into shallows with rock bottom and sand shoals. What of the third? The valley narrows at Gloucester since the hill country approaches the river on either side, and the isolated hill of the Cotswolds, Robin's Wood, bring high ground almost to the river course. Again the river divides into two channels at Gloucester, while immediately to the north it is joined by the Leadon from the west and by several streams from the Cheltenham direction.

To-day this arrangement favours Gloucester in several ways. The well-known tidal bore, dangerous to small shipping, and much more to attempts to ford the stream, loses much force and consequently height of its head of water above the dividing of the stream at the Lower Parting. The division into several branches rendered it possible, quite early on, to construct bridges; while the gravel flats, due to waste brought down by the tributary streams, made a solid bottom suitable for a ford in place of the sticky mud left by the tide, which characterises so many streams of the west country.

A superficial examination of the position of Gloucester suggests that it was not originally intended by the Romans as a fort liable to siege; the hill of Robin's Wood would have lent itself far better. It looks as if the existence of the ford was known, as well as its difficulties arising from frequent flooding of the Severn, and the particular position was adopted at an emergency, possibly by a sudden military decision in order to secure a bridge head. The site chosen was naturally protected. On the north there was the (then) gorge of the Twyver brook and the broad marshes, beyond, by what is still called the Long Ford; on the west the Severn; to the south the Cemetery brook, supported later by a small out-lying fort at Hempsted; to the east the marches intersected by small brooks, with, most likely, forest behind.

The map of Gloucester is adapted from Bellows' investigations. Some of his inferences have not been supported by later discoveries, but it will be seen that the central point of modern Gloucester and its four main roads correspond with the main features of the Roman camp.

Like Chester and Warrington, the camp is on the side of the river *away* from the enemy. London is north of the Thames; Caerleon west of the Severn, as if military forces gave sufficient protection without natural support. Near the two gates heaps of oyster shells have been unearthed—of the coarse Mumbles kind near the west gate for the common soldiers, but "Colchesters" by the east for the officers. Near the latter, articles of fine glass and costly Samian ware (made probably in Gaul) are abundant; by the west the commoner Upware (Kent) and some Caistor (Northampton) ware. Does this not summon up a picture of local first-century trading? A street running east and west to the Severn still retains its mediæval title, Long Smith Street; and hereabouts the anvils and forges of the Roman farriers have been unearthed. Inertia is a factor to be borne in mind in geography; for centuries the iron of the Forest of Dean was brought by boat to the quay near the end of this street.

Presumably Gloucester gave way to Caerleon, as the chief camp of the West Country; as a camp it may actually have been deserted after the first century. The abundance of coins of the early Emperors, and the rarity of others, support this idea. The development of "coloniæ," of which Gloucester was one, was very marked in the later portion of the 11th century.

The Romans called Gloucester, Glevum or Clevum; its name is shortened to Glev. on the second century monument discovered at Bath. I cannot regard the usual derivation from Glou. (Gloi : Gloui) Celtic for "light" or "fair" as correct. If the word came from such a root I should prefer the meaning as in Nant-y-glo or Cwm-y-glo, where "glo" means charcoal. Gloucester from the beginning was connected with the forest smelting of iron. But I lean myself to finding the origin of the word in "Cleeve" or "clwyd." "Cleve" is a common place-name in the region between Worcester and Dartmoor, and is applied to hamlets and villages on the lower slopes forming approaches to cliffs. This is the more likely since "Clwyd" or "Clud" becomes Cloud, as in Cleeve Cloud near Cheltenham and Cloud Hill near Congleton (Cheshire). Glevum would be the slope up from the river to the flats from which the Cotswold scarp rises sharply. A bishop of Cleeve attended one of the early Christian conferences abroad.

The Saxons preserved the Roman name, e.g., Gleaveceasdre, A.D. 681, and Gleawancaester A.S. Chron. But the Latin writers who came with the Normans insisted on deriving the name from a patronymic, and so by A.D .1080 we get "Claudia Civitas" and "Cleucestra," and later "Claudicestrea," abbreviated in Domesday Book to Glouuecestre and later to Gloecestre, Claucetre and Glocetre. Fanciful derivations always lead to the creation of rivals, and so the Welsh writers of the 12th century and earlier "discovered" a Pre-Roman settlement, Caer Gloi (or Glou or Glovi), named from a Celtic chieftain. Nennius has it—"The four sons of Gloui built Gloiuda, a great city upon the banks of the river Severn, and in British is called Caer Gloui, in Saxon Gloecester." The phrase is probably a late interpolation in Nennius' manuscript, for one of these worthies, according to William of Malmesbury, was a late bishop, who made grants to Glastonbury Abbey.

Again, the spurious itineraries, especially that of Richard of Cirencester, vary the name and write "Glebon" Colonia.

Some modern place-names ending in "Cleve" are certainly derived from an Old English word "Cleofa," "cliofa" or "Clyfe," which the Oxford Dictionary says is identical with the Old Teut. word "Klibon"—a sleeping place.

A Cirencester man would not regard Gloucester as equal in importance to his native city, and the description of Gloucester as a "resting place" on the bank of the river Severn, where travellers may await the abatement of floods in order to cross the ford describes the town there exactly.

To return to early Gloucester. The Roman buildings are found six to eight feet down. An examination of the shafts of the pillars of St. Bartholomew's Hospital by West Gate Bridge shows that they have been raised at least eight feet; the pillars of the East Gate (away from the river) were discovered submerged, while the meadows, known as the Hams, by the river, have been raised six feet and more since Roman times. Even as late as 1770 the floor of St. Mary de Lode Church, on the low ground west of the Cathedral, was four feet under water. It is not surprising that such facts have been taken to mean that the land has been sinking since Roman times. But hasty conclusions are dangerous. Luckily in this district some of the earth movements of recent geological time have been registered by nature. Along the Wye above Chepstow, just as along the Dee near Llangollen, entrenched meanders, cut deep into hard rocks like Carboniferous Limestone, prove that the land was rising, and so increasing the cutting power of the streams which maintained their sinuous courses, the deposits showing that this occurred during the Glacial period. Again at Barry, as in many other places on either side of the Irish Sea, sinkage, at least 60-70 feet, since the beginning of Neolithic times is shown by a series of peat beds containing fresh water shells and some human remains below low watermark. But the evidence of Roman settlements about the Severn, e.g., the Roman docks at Sea Mills, proves that the land surface remained steady since the coming of the Romans. In late Neolithic times, and perhaps later still, the lower Severn was occupied by a lake, or a series of them most likely held up by glacial material. At Sharpness the lower part is old forest growth of oak, beech, hazel and alder, containing bones of deer, horse, dog and ox, with evidence of human work, and the upper layers are of peat (produced by bog and water plants only). These lakes disappeared in part owing to the deposit of silt and partly owing to the growth of peat, which is 12 feet thick at Framilode, though only two feet thick at Over Bridge, Gloucester, where it is 24 feet down. The thinning of the peat up channel is suggestive.

The Severn tributaries bring down considerable quantities of mud from the surfaces of glacial clay and the beds of the Trias and Lias. At Tewkesbury as much as 37½ feet of silt have accumulated during the Human Period, as shown by the pottery found at the bottom. Leland, writing about 1540-50, says of Deerhurst, a few miles north of Gloucester: "When Severn much riseth, the water cummith almost about the towne. It is to be supposed that it was of old time lesse subject to waters, and that the bottom of Severne then deeper without choking of sand did at flouds leste hurt."

Even below Gloucester the deposition of mud to-day leads to the formation of small grass-covered flats, which gradually become large enough for enclosure as pastures.

The accumulation of river detritus about Gloucester has not merely rendered the valley more liable to flood. The narrowing of the long estuary funnel causes the tidal bore to rise to greater heights than formerly, which may account for the more frequent flooding. The raising of the main Welsh road from the West Gate, known as the Causeway in the time of Henry VIII, seems to have increased the flooding considerably.

And, as usual, where such conditions exist, there is some evidence that the Severn has changed its course more than once. A portion of the old course is still described by tradition, running round the east side of "Meanham," skirting St. Oswald's Priory, and under Foreign Bridge to the present channel or to one differing from it but slightly. (The term "foreign" was derived from "forinsecus" or "without the town.") Leland describes the old quay as on this arm of Severn near St. Oswald's " by streets that now be cleane decayed." " Those streets stood not most holesomely, and were subject to the raginge floodes of Severne." " The bridge that is on the chiefe arme of Severne that runneth hard by the towne is of seven great arches . . . . a little way further there is another bridge without the west gate of this bridge hath five great arches," and again later, " five arches in a bridge upon a piece of Severn." (This is West Gate Bridge over the chief arm of Severn to-day). " At the end of this causeway is a bridge of eight arches not yet finished " (and nowhere described as upon a piece of Severn).

Speed (circa 1600) still traces in his map what Leland describes as the chief arm of Severne, but indicates it as a very subordinate stream of which the bridges have not the same number of arches in use. Ogilby's Britannia Depicta map (end of the 17th century) shows the Old Severn crossing the main stream of to-day both above and below the West Gate Bridge.

To-day the Old Severne has entirely disappeared from the surface about St. Oswald's and Foreign Bridge.

It is safe to infer, even though the evidence is meagre, that the Quay was shifted to its present position before temp: Edward IV, and that a sufficient volume of water ran by the West Gate course, temp: Henry II, to call for a substantial bridge. The bridge over Old or Little Severn was rebuilt temp: Henry III. It is thought that channels to carry off some of its waters westwards were made artificially above the Causeway.

The Leadon most likely joined Old Severn above Gloucester. In 1236 the Abbot of St. Peter's granted free grazing to the burgesses on his meadows between West Gate Bridge and " Old Ledan." These meadows lay on either side of the bridge, and were not included within the city boundaries in the xivth century. In the perambulation of 1371, A.D., the terms Severn and Little Severn are used just as at a later date.

The Roman road by the Causeway ran straight, as if the stream at the west end was insignificant. It did not turn north, as now, to a big bridge over what is now the western arm of Severn. No important bridge there is mentioned until Leland records one of eight arches " not yet finished." The Forest Perambulation Record of A.D. 1228, speaks of the boundary running " from Gloucester Bridge on the west side of the city," but that of 1300 as from " the bridge over the Leadon near Over at Gloucester," as if a new dividing line had been created.

So I take it that the Leadon was diverted naturally or artificially prior to A.D. 1230, and that in Henry II's reign more water was coming down the West Gate branch of Severn, while in Henry VIII's time Old Severn was practically side-tracked, the Severn waters increasing along what is now the west branch.

It follows from all this that the Romans probably found the main stream along what is now called the " Old Severn," close up to the slope on which they placed their camp; and in historic times various channels were opened, whereby the stream has moved further away westwards from Gloucester. This change must be borne in mind if the circumstances of the founding of Gloucester are to be fully appreciated.

One feature of Roman Gloucester is peculiar. From the N.S. and W. gates important roads debouched. But the great east road (Ermin Street) broke away from the north road about one mile after leaving Gloucester by the north gate. It would seem that Gloucester was originally reached by the Romans from the east; the east Gate points directly towards Cirencester, the old capital of the Dobuni. And an ancient road, Port Way, can be seen following this line near Upton St. Leonards. Comparing the gradients of this road with Ermin Street, they are much easier. I suggest that the Port Way was the original Roman road to the East Gate, and that the main road was moved later 1½ miles to the north : Burials along it suggest that it was not made until the II. or III. century. This was not a common procedure, but an instance in West Spain (Merida) has been mentioned to me. The old road from the East Gate was not abandoned; it is shown by Ogilby as the main coach road to London in his time.

Experience in all ages has led merchants with heavy traffic to choose ways avoiding soft clays or greasy surfaces of chalk and boglands, and to prefer those over rock, gravels and sands. The direct way to Gloucester passed over deep brook courses, cut in impervious Lias clay, which in rainy seasons must have been almost impassable. The newer Ermin Street often followed the ridgeway between stream courses, and usually was carried over surfaces of gravel and sand. At Hucclecote, three miles east of Gloucester, the ridgeway is on the clay; the gravel begins 50 yards down the slope, and the road is diverted to follow the gravel outcrop. (This aspect of road traffic is fully dealt with in connection with London by Professor Fairgrieve in " The Geographical Teacher " for Summer, 1909 (No. 24, Vol. V., Pt. 1).

Another interesting point in Gloucester is the discovery of Roman remains in great abundance and variety at Kingsholm and Wotton—a mile to the north of Old Gloucester—far more important than in the Roman Camp and its immediate vicinity. Thousands of burials have been recorded alongside the north road and Ermin Street—innumerable Roman coins have been unearthed in the nurseries thereabouts, and in Kingsholm spears, daggers, axes, gold rings, many antiques, steel yards, pottery. The coins include large numbers of Tiberius, Nero, Claudius, and other early Emperors. It has been inferred that the civil population lived here. Some have suggested a quay on the Severn as the cause—certainly from evidence forthcoming at Lydney a fleet protected the Severn. Again, others have noticed that Ermin Way, if projected westwards in a straight line, would strike the river here.

The map showing Roman roads may assist in giving the clue. Gloucester, after Caerleon grew to first rank, was not, in my view, a permanent camp. Nothing has been discovered which supports the theory of a shipping port at Kingsholm, and there is no evidence of great manufactories as at Veratinum (Warrington); the signs of smelting at Lydney and Wormelow (Herefordshire) are much clearer. But the gravels about Gloucester are very variable in thickness, and give way suddenly to clay and silt. At Kingsholm the sand and gravel are fairly thick, while at Maisemore opposite, and west of Severn, the drift gravel is found covering the surface even to 100′ above O.D. This would afford a landing very different from the thick clay with peat at the western end of the Causeway at Over. I look on the passage from Kingsholm to Maisemore as the leading ford on the Severn in Roman times, and of far greater importance than the sea way.

The distribution of Pre-Roman remains suggests that tracks led to a Severn crossing here where the gravel fans of the Leadon and opposite streams gave a sound bottom for waggons with loads of iron ore from the Forest of Dean. The Romans kept it in use for their carriage of gold from the Llandovery district, of iron and perhaps coal from the Forest, and of the lead and zinc from Mid Wales. The many coins found in the Forest show working of the mines in the periods of the later Emperors. Kingsholm would be the " Glebon," the waiting place for crossing—a commercial centre and administrative headquarters for an area bounded to the west by that ruled from Caerwent (Venta Silurum), and to the east by that of Corinium Dobunorum (Cirencester). Separation from the military camp was not unknown : according to Haverfield the colonia at York was divided from the camp by the River Ouse.

Many settlers at this " colonia " would be ex-military men, and it is interesting to note from monuments that they went to Bath for their health, and that the Romans had an Eastern question which they solved by sending the young men to other countries. A tombstone at Wotton, now within the city boundary, records that " Rufus Sita—a horseman of the VI cohort of Thracians, aged 40 years, served 22 years."

Of the earlier Saxon times little is known. One of the early decisive victories of the Saxons over the Celts was the securing of the Gloucester ford by the battle of Dyrham. It is worth noting that the region was associated mostly with the Midlands, as now. The Mercian kings probably valued the sea way highly. Gloucester, like Bath and Wells, grew again in importance as ecclesiastical centres on the old Roman roads. Much land went out of cultivation. The " villa system " was much in vogue hereabouts in late Roman times, when climatic and other causes compelled Rome to import the bulk of her wheat; yet the Saxon place names point to the region having reverted to forest conditions.

But when the change came from simple agriculture to mixed trading by boat and horse, as carried on by the Danes, Gloucester rose again. While the importance of its ford was not lost sight of, the value of the waterway of the Severn came prominently to the front. As a port it could not compete against Bristol, with its gateway direct into the more fully-developed southern region, of the activities of which the ecclesiastical denunciation of the slave trade prior to the Norman Conquest suggests a picture. But the opposition of the Alfred dynasty to the Danish encroachments by land and sea gave Gloucester the leading position. Coins were minted; Athelstan died here; and tradition makes Edmund Ironside meet in single combat Canute on an island near Gloucester, Olanig, a name which is preserved in Alney, the island between the two branches of Severn at Gloucester. In the old Welsh stories the Champion of the Ford is said to be seated " on a flat island below the ford," with his own forces on one side, whence he sees various troops in striking costumes, and learns by enquiry that they are " the men of Norway and the men of Denmark."

Camden and Plummer refuse to identify Olanig with Alney, preferring an islet further north, since the A.S. Chron. speaks of Deerhurst and not Gloucester. They are on safe ground, seeing that Alney did not exist then as now. But in old Saxon charters the name Olan and Olitane (connected with the Gaulish Litanos and the Celtic Lit. and Welsh Llêd from letos—broad) is not uncommon, and is sometimes associated in the text with Ledenford. Litana and Olitane becomes Leadon in English-speaking districts, which brings us back to the gravel fan of the Leadon, just above Gloucester, as the probable meeting ground where Edmund and Canute agreed to divide the Kingdom. In any case Edmund retained possession of the ford.

Again Edward the Confessor introduced continental ideas into England, and kept state at Winchester for Easter, at Westminster for Whitsuntide, and at Gloucester for Christmas, his palace being at Kingsholm, and the Gloucester people paying their dues in kind—in iron and honey.

Each capital was at the head of the main tidal way for navigation of the three main entrances to the kingdom from the sea.

The Norman kings continued this arrangement. Their military autocracy was not opposed to the town system, which gave an army at short notice, provided funds through its commerce, and was favourably situated as a centre of supplies. The Norman castle of Gloucester was placed where it could overawe the town, just outside, on the river, with a retreat by water when needed, and full control of riverborne trade at other times. Unlike Oxford, Warwick, etc., no mound was thrown up, but an island in the river, called the "Naight" or "Eight," (a word bearing the same meaning as "eyot" or "island") was formed by excavating a branch channel, while on the town side of the castle another channel was dug. A charter of Llanthony Abbey, dated some centuries later, speaks of a wet ditch full of fish.

At the headquarters of a County Palatine, Gloucester supplied forces repeatedly for struggles in South Wales. Its very success led ultimately to its disintegration by the shifting of the centre of power for the conquered lands from Gloucester to Cardiff and the attachment of the earldom to the Crown.

Like Chester, it has ever tended in peace times to become of second rate importance, but with internal warfare it regularly came to the front again. Two instances will suffice.

(a) In alliance with the Earl of Gloucester, Simon de Montfort defeated the royal forces and held the King risoner. But soon after a quarrel with Gloucester, Prince Edward escaped from Montfort when at Hereford. Gloucester was able with his land forces to hold the line of the Severn, while his fleet prevented the attempt of de Montfort to cross Bristol Channel from Newport. This delay sufficed for the Prince to collect an army and to overcome the Montfort faction entirely.

(b) During the Civil War Gloucester city was for Parliament. The King made a series of attempts to overcome it, since it blocked the direct way from Bristol to the North, and it prevented a free passage from Oxford to South Wales, whence came the supply of horses for the later campaigns.

In the early Norman and Plantagenet periods peace conditions allowed much development, which was fostered by royal charters and guilds.

(i) Firstly through **iron** manufactories. Up to the late xiiith century Gloucestershire was the main iron manufacturing centre of the country. Large demands were made in connection with Crown needs, especially for wars abroad, and so, under the Plantagenets, horseshoes, nails, axes, spades, arrowheads, and the like, were made in vast quantities at Gloucester, e.g., 30,000 horseshoes were shipped thence when Richard I left for the Holy Land. Decay of the industry came with the exhaustion of the known hæmatite deposits of the Forest of the Dean and the development of other ironfields. But inertia came into play. More specialised metal industries succeeded. Bell casting was a prosperous industry from the Middle Ages until the late xixth century—pin manufacture was introduced after the Restoration, and, with the late opening of the Canal, iron foundries have been again started.

In this connection it may be worth noting that coal was being mined both in the Forest of Dean and the Bristol coal basins during the xiiith century.

(ii) **Wool trade.** Gloucester, in Norman times, paid annually to the Crown 30,000 sacks of Cotswold wool. Foreigners valued it highly, e.g., Florence (temp: Edward III), and Portugal and Spain later still. Woollen manufacturers at Gloucester were considerable during the xivth and xvth centuries, but were declining in the xvith, though revived for a while by the addition of silk manufactures. All were at a low ebb by the middle of the xviith century. Decline was natural enough. The streams lose their force in crossing the low ground, and gather up much suspended matter from Lias clays and glacial sands. The Huguenots and Flemish settlers of Tudor times, who brought new methods of weaving and secret processes of dyeing, settled near the scarp from Stroud to Winchcombe beyond Cheltenham, (i) near the supplies of Fuller's earth, (ii) where the water was cleaner, and (iii) where the streams sufficed to turn the driving wheels of the factories specially exempted from restrictive legislation. Gloucester could not compete with them.

(iii) **Shipping.** Gloucester declined rapidly as a port about the same time as Chester, and largely from the same cause—the silting up of the channel. In 1847 the mayor reported the "great ruin and decay of the said town, decayed within a few years to the number of 300 or more dwelling places." The Tudors attempted to revive the shipping by compelling attention to the navigable ways, and Henry VIII gave the mayor power to seize property if owners would not rebuild or repair. In 1580 the port of Gloucester was defined by law as stretching from Tewkesbury to Berkeley. Bristol raised objections on the grounds that there were " no lawful wares to be shipped " and that they " allow small barkes with corn and prohibited wares from which much profit." Little came from Royal encouragement, and Gloucester fell out of Court favour with the Great Rebellion. But a great revival followed the opening of the Berkeley Canal in 1827, which cut out a number of meanders and gave greater security from tides. The canal was further improved in 1874 by the construction of a tidal basin and floating dock at the Sharpness entrance, allowing vessels of 9,000 tons to reach Sharpness, of 1,200 tons to reach Gloucester, while smaller vessels can proceed by the smaller canals—some of 250 tons as far as Worcester, and of 40 tons to Birmingham and Wolverhampton. Gloucester thus receives general continental cargoes—is connected with the Black Sea and Argentine trade, and much timber is brought from Canada and the Baltic, while export trade includes much from the Midlands, salt from Droitwich, and coal from the Forest of Dean.

The population figures indicate the sudden development:—

temp. William I	2,500
A.D. 1562	4,000— 828 householders.
1712	4,990— 1,003 householders.
1743	5,585—1,335 householders.
1801	7,265—2,000 families, 1, 368 houses.
1871	18,341—3,093 houses.
1891	39,444— 7,836 houses.
1901	47,955—10,098 houses.
1911	50,035—11,130 families, 10,871 houses.
1921	51,330—(other details not yet published).

It is possible from such geographical data to form some idea as to the future of Gloucester. The following facts cannot be overlooked:—

(1). Gloucester as a port cannot compete with Bristol and the other ports of the Bristol Channel.

(2). The ecclesiastical arm, as in the case of Canterbury, Chester, Lichfield, Oxford, etc., was not favourable to trade development, with the result that other centres, e.g., Stroud, were formed, and grew strong during the Industrial Revolution.

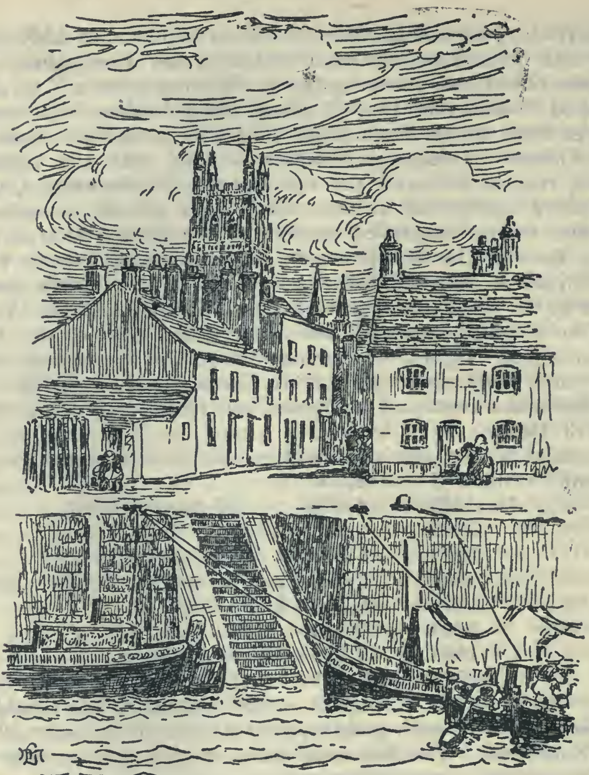
(3). Modern railway and road improvements minimise its nodal importance. Thus some express trains connect Worcester and Cheltenham with London, avoiding Gloucester; the Severn Tunnel sidetracked Gloucester as regards South Wales traffic—the combined L.N.W. and G.W.R. line to the North via Hereford considerably reduced the volume of its trade, while the Severn Bridge near Sharpness took away much of the Forest of Dean coal carriage.

(4). The Severn fisheries have been practically ruined in consequence of pollution from trade development.

(5). There is nothing at Gloucester suggestive of " cheap power." This might be altered if the great electrification scheme involving the "harnessing" of the tidal Severn near Chepstow is ever carried out.

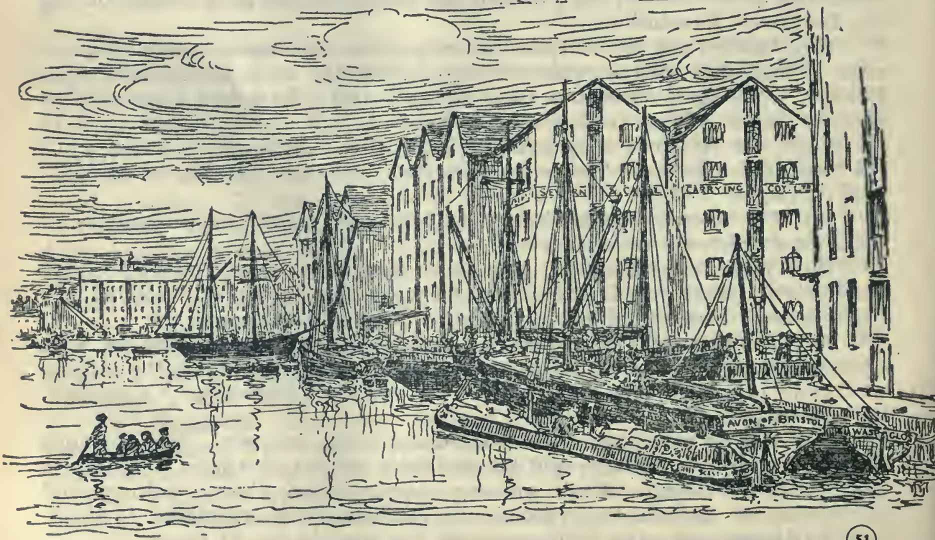
(6). The Cotswold scarp makes a real break with London and the S.E. Cheltenham is more closely connected by the gap through which the railway to Oxford is carried, but it is too far removed from Gloucester for amalgamation.

(7). But as a market centre Gloucester holds its own. The demands of the Birmingham, Bristol, and South Wales districts for food supplies are continually increasing. Fruit growing, jam making, cheese making, and the raising of stock in the regions adjacent, are doing something to maintain its importance as a business centre for interchange of goods.



Gloucester . quay below the bridge. (50)

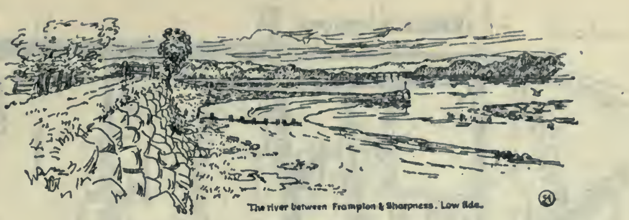
Fig. 1.


SEVERN & CANAL CARRYING COY. LTD
AVON OF BRISTOL
WAST GLOS

(51)

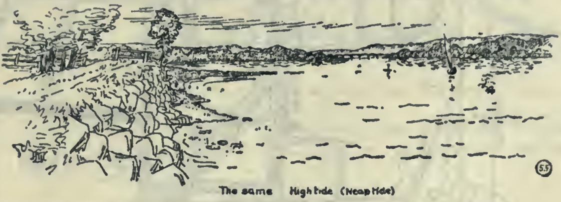
Gloucester Docks.

Fig. 2.



The river between Frampton & Sharpness. Low tide. (51)

Fig. 3.

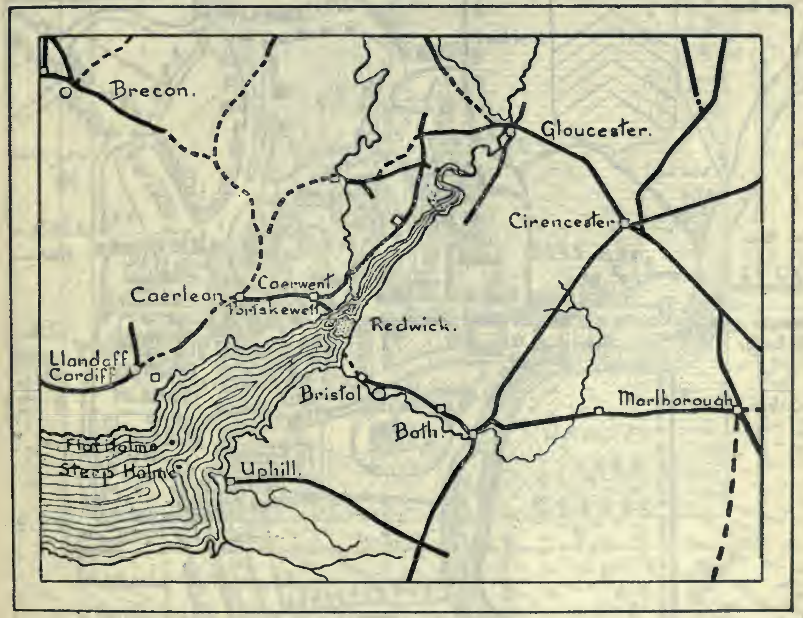


The same High tide (Neap tide) (55)

Fig. 4.

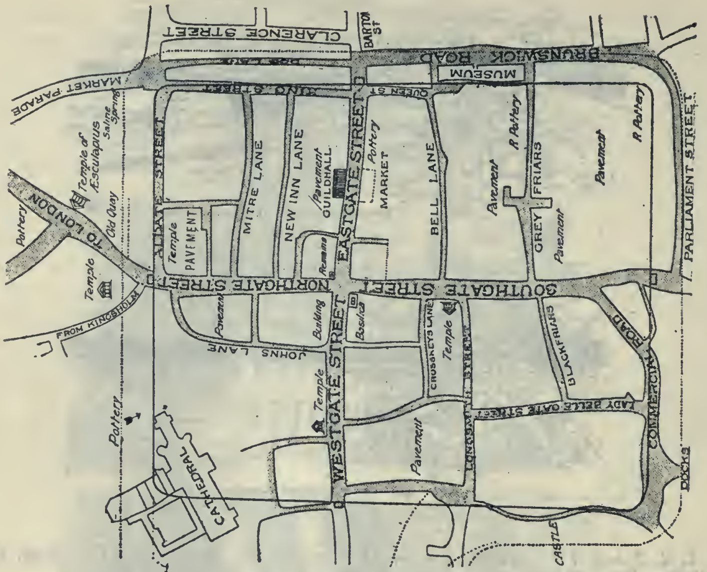
Figs. 1, 2, 3 and 4 are kindly lent by Messrs. Thorne, Marby and Co., from a book, "The River Severn from Source to Mouth," by M. Lanchester.

Map I.

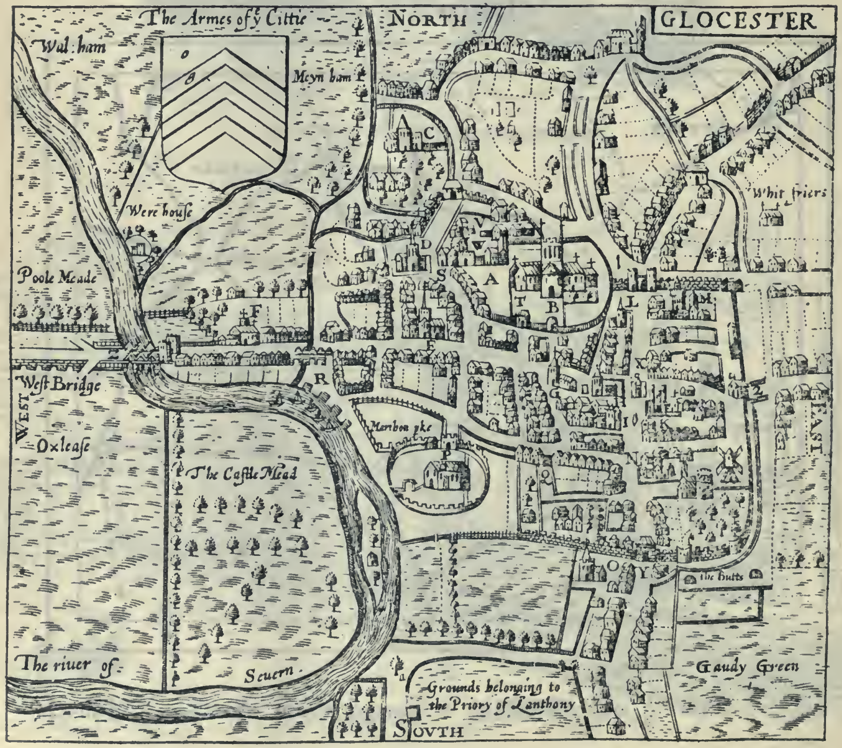


Severn showing old crossings & Roman roads of adjacent districts

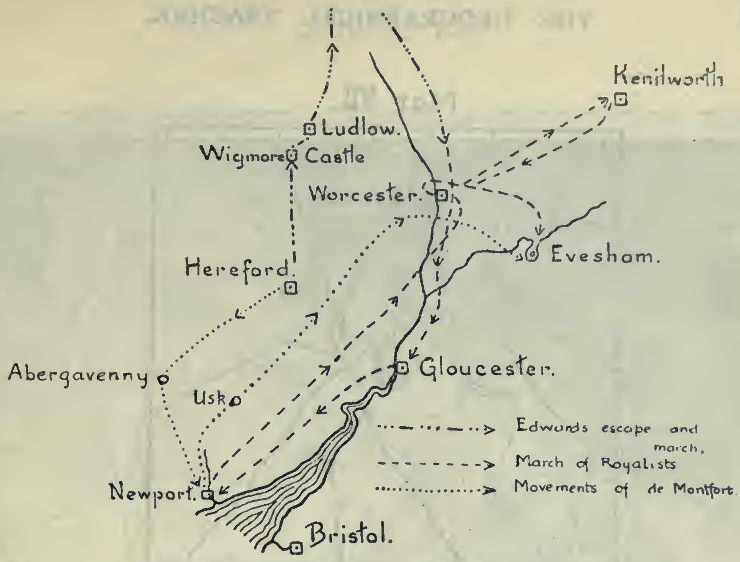
Map III.



Roman Gloucester.

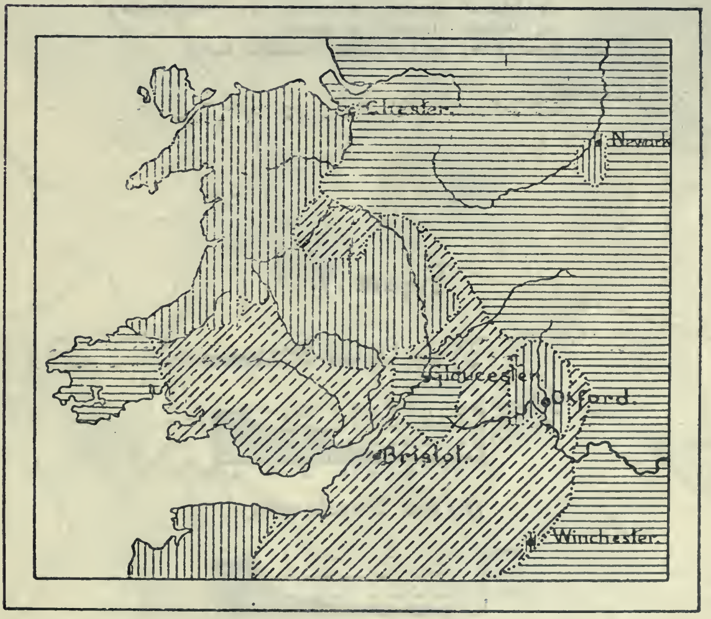


Map V.



Gloucester time of Simon de Montfort.

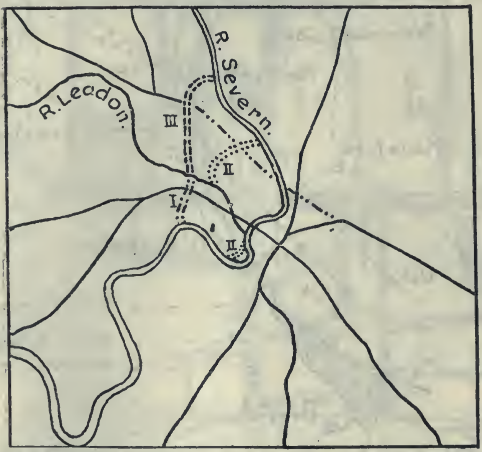
Map VI.



Held by Parliament beginning of 1645. ▤
Captured by Parliament from King during campaign. ▨
Still held by King at end of campaign. ▥

Gloucester during Civil War.

Map VII.



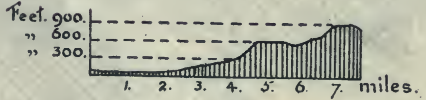
Gradual removal of Severn westwards, & Roman roads of Gloucester district.

I. Diversion of Leadon.
II. Second channel of Severn, now main course.
III Western branch of Severn.

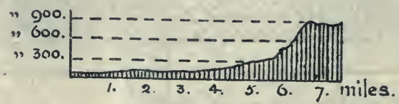
Note Roman roads on both sides of Leadon. Valley.

Figure V.

(i.) via Upton St. Leonards.

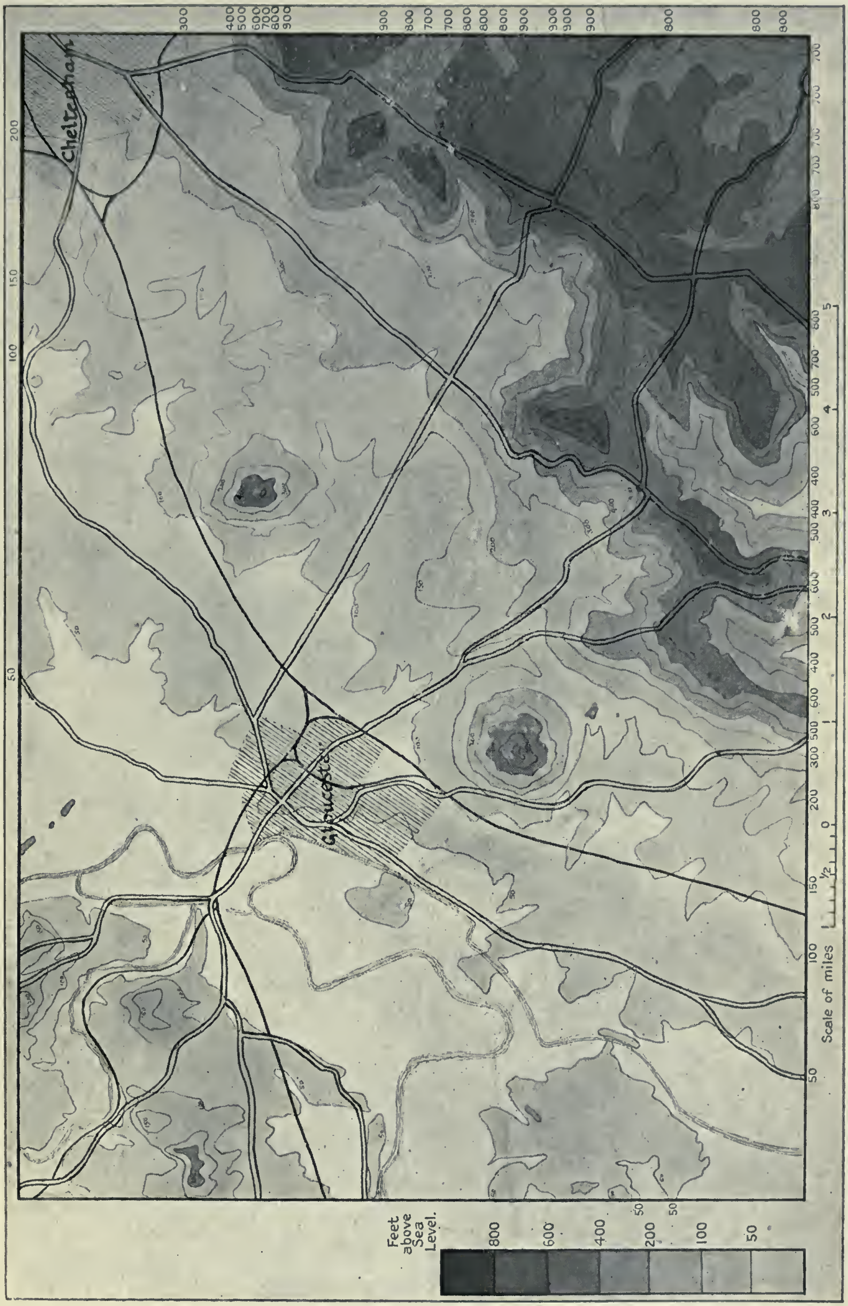


(ii) via Hucclecote.



Parallel sections of Ermine Street.

All the illustrations accompanying this article, and appearing elsewhere in the "Geographical Teacher," are printed from blocks made by Messrs. Bale and Danielsson, Great Titchfield Street, W.


Cheltenham
Gloucester
Scale of miles
0
½
1
2
3
4
5
Feet above Sea Level.
800
600
400
200
100
50

STAGES IN HEAD EROSION.

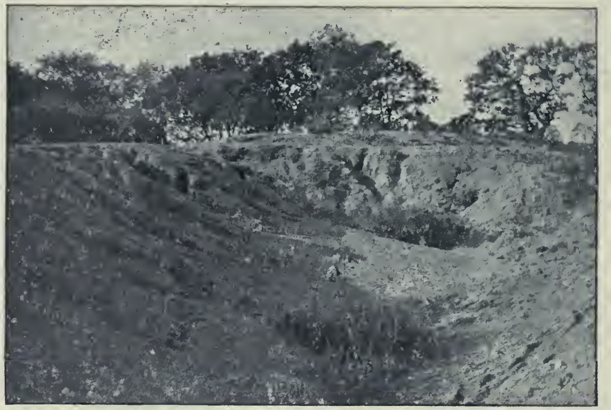


Fig. 1.

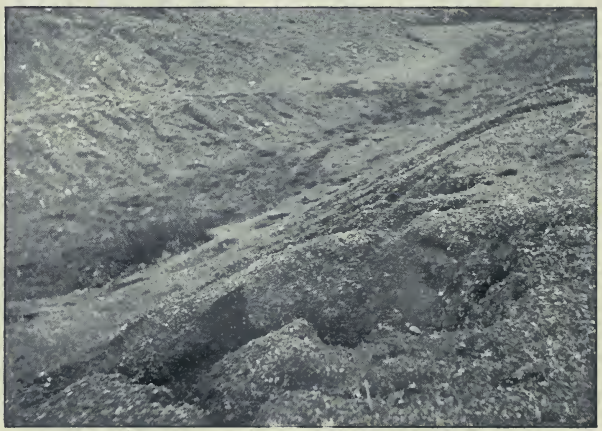


Fig. 2.

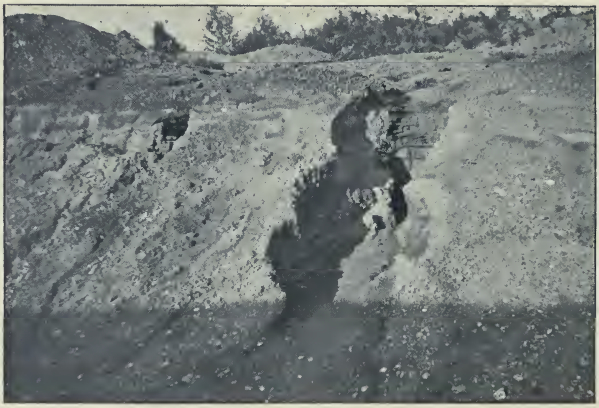


Fig. 3.

HEADWARD EROSION.

By H. Graves.

TEXT-BOOKS of physical geography usually give full and lucid accounts of the actual working of the various natural processes that enter into earth sculpture, but upon one of these there seems to be a universal conspiracy of silence. I refer to the process of,'' headward erosion,'' by which a river is said to increase its length by '' cutting back '' its source.

Professor W. M. Davis says that '' ravines gradually lengthen headwards,'' and that a '' valley gnaws its way headward,'' but does not describe the way in which this interesting process works. Mr. Bernard Smith speaks of rivers which '' rapidly cut back into the divide.'' Professor Tarr says that the '' tributary streams gnaw their way back from the main stream,'' but none of them venture on more than these very curt statements.

Messrs. Simmons and Stenhouse say that '' the erosion is naturally greatest where the bed is steepest and the flow most rapid. The result is that the deepening of the bed near the source continually cuts back the source itself.'' This is the nearest approach to a detailed statement that I have found, but the explanation stops far short of completeness.

And yet the idea of a river '' cutting back '' beyond its source is, on the face of it, paradoxical, and I have found that pupils who have read these books generally come for an explanation of how water can possibly flow backwards. Nor is it the easiest thing to frame an explanation at once lucid and credible.

The root of the difficulty is that while it is easy enough to point to river gorges that can have been formed in no other manner, it is by no means easy to catch a river visibly in the act of '' cutting backward.''

By good luck I have found, not indeed a river, but a series of small gorges made by intermittent watercourses, which are actually '' cutting backwards.'' In a gravel pit which lies off a bye road (near a house called Kelling Pines) from Holt (Norfolk) to Weybourne, there are banks of gravel and of sandy strata, which have been untouched by workmen for ten years, and in these years the rain has been busy cutting gorges. The most instructive of these banks is about eight feet high; its top forms a table-land some fifty feet long by about five feet broad, and the gorges run down to the floor of the gravel pit. These gorges are cutting their way back into the table-land. (See Fig. 1).

In order to have positive proof that this is the case, I drove in small wooden labels to mark the highest point which each had reached, and awaited the result. This was small but visible. In three cases I found an encroachment of three inches, in six of one to two inches, while in numerous others, where the gravel was firmer, it amounted only to almost imperceptible fractions of an inch. The erosion at the extreme head of the gorges was necessarily slow and feeble, since there it was done by the rain water as it drained from the table-land without any material aid from suspended fragments of gravel, but the erosion caused by the water, when it had taken the plunge down the steep gradient of the gorge and had the help of loose sand and shingle, which, with its increased speed, it became able to carry, was rapid and vigorous. The sides of the gorges were undermined, their span widened to some twenty inches, and in several of the cases the angle where the slope of the gorge meets the level of the table-land, is on the point of caving in, when a substantial and wide addition will be made to the length of the gorge. (See Fig. 2).

In another part of the gravel-pit an interesting variety of the same process is in progress. A steep slope some thirty feet high is being dissected by channels, but the slope itself is interrupted by terraces caused by harder strata, and what has happened to the channel at these points is that intermittent miniature waterfalls have formed, in which he resistent strata have been undercut and are gradually breaking away. The widest of these " waterfalls " is about three feet in span. (See Fig. 3). But in this type of case, as in that described above, the ravine is " gnawing headward."

The inference from these phenomena is that any ravine once formed will grow headwards, the reason being that the ravine serves as a trap to entice rain water which has fallen at a higher level. The water takes the line of least resistance, and the steeper the gully the more effective trap it is for the water; the larger the catchment basin of the ravine the more ample is the addition to the river.

I may be met by the objection that the problem which we are discussing is that of the headward erosion of rivers, and that no river has entered into my experiment. I doubt the validity of this objection. If my gullies emptied themselves into a river instead of on to the floor of the gravel pit, the principle would be exactly the same. The river-bed, with its steep gradient (and all cutting-back rivers are admitted to have steep gradients) would simply serve as a trap for rivulets formed of rain falling on land at a higher level than the river, and those rivulets would lead the rain-water into the river in the same way as my gullies lead the water from my tiny table-land to the floor of the gravel-pit. And it is by gullies or channels which form above the existing head of a river and unite themselves to it that the course of a river is extended headwards. At this point we may reasonably consider whether the terms " headward erosion " and " cutting back," are after all well chosen. For, except in the case of a waterfall occurring in the course of a stream, it may be doubted whether a stream can itself be said to do in the literal sense any "cutting back." What really happens is that water collecting on higher levels than the present " source " of a stream (i.e., in normal cases the highest point to which the stream can be traced as such), in its ordinary forward progress carves itself a channel, and that this channel, guided by the slope of the country, naturally finds its way into the stream. The stream thus serves simply as a trap, into which the new-born rivulet, taking the line of least resistance, hastens to precipitate itself.

The expression " cutting back " is not then to be taken as a statement of what actually happens, but as a short way, at least in ordinary cases, of saying that a stream of steep gradient attracts to itself additions actually formed by agencies external to itself. But in this case, which is typical of many others, these additions have been formed by the ordinary forward movement of water, and not by any process which can be called " cutting back."

NOTE.—The Professor of Physical Geology at Cornell University, who was so kind as to send me his views on the subject of " Head Erosion," was of opinion that in America the recession of waterfalls had been the chief factor in the " cutting back " of rivers. It is very much to be hoped that he will give the world his views in detail.

Killik's Argentine Railway Manual. 80 pp. and maps. 18 x 12.5 cm. London: Effingham Wilson, 1923. 2/6.

This is a financial annual giving an account of each railway company and its stocks and shares, and supplementing the data of this kind by a map of the railway systems. We are obliged to Messrs. Killik for their kindness in sending us a copy, and would point out that the book would gain in interest from their point of view as well as from ours if to the summary of goods traffic could be added some mention of live stock transport. A large and elaborate folder map is appended to the book, and will be found to be of considerable value.

THE ECONOMIC FUTURE OF INDIA.

J. N. L. BAKER.

THE present economic distress in Great Britain has led many people to consider some of the important factors regulating her overseas trade, and, in particular, her trade within the limits of the Empire. This latter, prominently discussed in the pages of newspapers, has been emphasised by official pronouncements for the forthcoming Imperial Economic Conference. To geographers the subject is of considerable importance because it involves a study of conditions abroad as well as at home. In a recent speech the then Parliamentary Secretary for Overseas Trade stated that the changing economic conditions in India, one of Britain's best customers, were likely to affect trade relations with this country adversely. This is, perhaps, an overstatement, but the situation demands attention, and it is with the practical object of appreciating it that the following points are suggested. To the average Englishman India means very little. He has a vague idea that it is "in the East," and a few notions, generally wrong, of Hindu religious customs. A schoolboy recently wrote in an examination paper that the Ganges was a sacred river into which Indians every year threw their children. This unhappy mixture of a profound geographical fact with an absurd perversion of truth is, however, quite typical of average ideas on India. To understand her future prospects therefore we must refer to her past and her present history, since what India has been will very largely determine what she will be. Her ancient civilisation was flourishing when Pytheas discovered the English coast: the great Mongul Emperor Akbar was contemporary with Queen Elizabeth: but conditions in India from the geographical point of view were largely the same in the time of the Mutiny as in the splendour of Asoka's empire. There is a remarkable continuity in India's history which can only be understood by a knowledge of geographical conditions.

The past speaks of two important economic facts, the first of which is the dominating influence of agriculture. Its home—the plain of the Ganges—has been the seat of many empires: its pursuit is the work of three-quarters of the population. The Indian budget is still "a gamble in rain" in spite of vastly increased areas under irrigation. Within recent years the position of the agriculturist has probably improved, but he still remains beset with poverty "of a kind which finds no parallel in the more exigent, because less tropical, climate of Europe."[1] In this agricultural life the village played an important part as an independent and isolated unit, and also as a centre for the development of local industries. Of these probably spinning was the most important, and to-day many villagers make cotton cloth to supply their immediate needs. Leather workers and moulders of copper are to be found in many remote parts of India still, and copper working is a very ancient art. So, too, iron smelting was once widespread, and the famous wootz steel was made long before the Christian era. These few facts will serve to depict something of the life of old India and to form a basis from which it is possible to estimate future developments.

The present economic life of India is noteworthy for its remarkable industrial developments. It is sufficient to give a very brief indication of some of the more important. In 1878 about a million tons of coal[2] were produced; in 1919, the amount was nearly twenty-three million tons. Great improvements have been made in the process of mining through the introduction of electrically driven pumps, haulages and cutting machines, in the working of which the Indian has shown remarkable adaptability. Two-hundred thousand workers are employed, and although the output per person is less than half that of the United Kingdom, the pitmouth price is the cheapest in the world, the average for India for the period 1913-1916 being 4s. 6d. per ton compared with 12s. 0¾d. for this country. Since the beginning of the present century the bulk of the railway requirements have been supplied by Indian collieries. It should be remembered that the domestic requirements of the country are very small.

Similar developments have taken place in the iron and steel industry. The Tata iron and steel works increased their production of pig iron from 162,282 tons in 1914 to 198,064 tons in 1918, while during the same period the steel output rose from 66,603 to 130,043 tons. The Barkar iron works of Bengal have a daily production of about 300 tons of pig iron. Steel rails are also important, the Tata Company turning out 71,000 tons in 1918. Much of this development can be traced directly to Government encouragement, helped by the closing of other sources of supply during the late war.

Similar progress can be seen in other Indian enterprises. The cotton mills and jute factories now compete with those of Lancashire and of Dundee: Cawnpore leather is largely used in the Indian army; glass and chemical industries are only waiting for money from the Government to make large developments. Matters of industry are now as a general rule dealt with by provincial ministers, and a full account of their progress during 1921 has been published.[1] It is enough to indicate some of the activities in Bengal. Machinery for the tea factories and the rice and jute mills is now made locally, while extensive developments have taken place in the domestic industries of match making and weaving.

Side by side with this industrial development definite progress has been made in agriculture. "The willingness of the agriculturist to learn how to improve the quantity and quality of his crops is being held by those in a position to form a sound judgment of the matter as the dawn of an era of intensive cultivation." Quantity and quality form the keynote to the activities of the Department of Agriculture, but progress is of necessity slow because of difficulties of finance, so that in all India the annual expenditure is only about £650,000 a year. There is a good demand for improved varieties of wheat, rice and sugar cane, while cotton, jute, indigo, tobacco, oilseeds, rubber, coffee, tea, fruit and fodder, have all received attention. It is worth while to observe in this connecton that the rice crop occupies more than a quarter of the area under cultivation in India, and is therefore of vital importance to the farmer; that Indian wheat usually commands a poor price because of low quality; that India has a larger area under sugar cane than any other country, although her output is small and she has to import sugar. In jute, she possesses practically a world monopoly: her cotton production is second only to America, although in yield, length of staple, and value, the crops are not so important. The work of the Agricultural Department is therefore fostering the staple products of the country. In addition, soil surveys and studies of crop pests have been made, while definite, though slow progress in cattle breeding and in the preservation of the animals from disease and famine has been reported.[3] The importance of this will be seen when it is realised that for every 100 people in British India there are 61 cattle.

Conditions in India would seem to demand that any great industrial development must be built up on an agricultural foundation. It is worth while to note that just as the industrial enterprises have been due to Western brains and Western—largely English—money, so progress in agriculture has also come from the same source. The prosperity of both in the immediate future would seem to depend upon the continuation of the alliance. The Indian Industrial Commission made it clear how relatively small was the contribution of the country towards its essential needs. Further it is well known that much of the progress, both of industry and agriculture, depends upon active Government interference. As the Government is now largely influenced by native opinion a further complicating factor is introduced. It is well therefore to attempt to understand some of the factors which will determine the economic future of the country.

Eastern life is both complicated and simple, and the complications arise from the curious interplay of so many simple factors. In India physical conditions and a great variety of men make a uniform policy or progress impossible. Baluchistan has nothing in common with Bengal. Political, social and religious factors affect the economic sphere in a puzzling manner. The Hindu cannot be asked to treat the question of cattle breeding in the same way as the Moslem. Imperial questions often beyond the control of Great Britain must also be considered. Bombay decides to boycott Australian manufactures because of the immigration policy of the Commonwealth. There are, further, within India itself two other sets of problems to be solved, ''internal'' because inherent in any economic development, and ''external'' because peculiar to India herself. Among the ''internal'' problems the first is that of labour. Agriculture has the first claim : industry comes second. Western enterprises are relatively new and there are no ''hereditary'' workers as in England. White supervision is general, but it may easily become too costly or undesirable for political reasons, and the Indian will then be thrown back on his own resources. That he can learn has been proved beyond dispute ; but it has yet to be demonstrated how far he can also teach. At the present time labour is neither cheap nor plentiful nor efficient, and it works best with white supervision. It is badly organised and often badly paid, while strikes are frequent—there were 400 in 1921—and Trade Union discipline is slack. The result has been the initiation by the Government of a definite labour policy.

Closely connected with it is the ''town'' problem. The first step towards raising the efficiency of the labourer is to raise his standard of living, which implies, besides wages, housing and general social questions. The Indian population is not as a general rule sanitary ; the death rate is high and infant mortality very great. Housing conditions are very far from satisfactory. Yet if Indian industries develop in a normal way general conditions of life must be improved, lest the toll of disease in the large towns replace the old mortality of famine now largely counteracted. In Bombay a beginning has been made with a very comprehensive housing scheme which represents a modified form of western experience.

Education also forms a problem, the solution of which is very difficult. It would seem that if labour is to be educated to take its place in the new industrial life, it should be along Western lines. So far its education is confined to a very few, and those not the men who form the ''working'' class. It generally leads to a post in Government service or to unemployment.[1] Facilities for education generally, and for technical education in particuar, are at present inadequate, although they are being developed slowly. It remains to be seen whether the Indian is prepared to pay for something which is foreign to his nature and, even if he is, it is difficult to see where the money will be found. Nearly seventeen million pounds were spent in 1920-21, or about one-tenth of the revenue, but at the moment India cannot afford more.

Finally, there is what may be called the ''caste'' problem. Caste is a social and religious system in which every man has a trade. Any breakdown here must intensify the problems of old age and unemployment, although it may do individual good. Public funds will then have to replace private charity. On the other hand, real economic progress is difficult if caste persists. Yet it has been stated by a high authority that in spite of appearances ''it may be doubted whether its hold over the community is weakening in essentials." If this be so, it may be well to consider carefully the position of the "depressed classes," whose lot under British rule has been happier than ever before, but who found a very definite place in the social structure. Numbering some fifty millions, they include sweepers, scavengers, leather workers, oil pressers, and in some parts cowherds and shepherds. In a new economic sphere many of these men will be attracted, by higher wages and better prospects, to the towns, and so intensify both rural and urban problems.

The "external" problem is difficult both to state and to appreciate, since it is so confused with current politics. Two years ago it might have been called "Mr Ghandi," and for convenience that term may be retained since many of his theories are still accepted. His general ideas have been well summarised as follows :—"The distinguishing livery of his disciples is a simple dress of the coarsest home-made cloth, with a box cap of the same material; the standard he sets himself and demands of others is one of complete, all-embracing sacrifice. He preaches and practices unity in a land where Hindu and Moslem are held apart by race, religion, and history. He did not blench from demanding in the quondam head-centre of Brahman oligarchy, better treatment for the 'depressed classes.' He wages increasing war against drink and luxury and vice in every form. In a day, when the great ethical ideals of the war are in danger of being submerged beneath a coarse materialism, he bids India find salvation in the monotonous labour of the spinning wheel, where a skilled worker may earn 2½d per day . . . It is probably no injustice to Mr Ghandi to say his ideal state is one consisting entirely of self-contained villages, with law, justice and government exercised by councils sitting in the shade of banyan trees."[5]

No one will deny the splendour of these ideals nor question the practical value of many of them. Nor is it a condemnation of them to say that they are reactionary. We must, however, look further to the results of their preaching. "Swaraj" took many meanings from a purely ethical to a combined political and economic ideal, but it gained its unity by opposition to the Government, an opposition which contributed materially to the tragedy of the Moplah rising. On the other hand, some believed that a golden age would begin when home spinning became universal, thus displacing machinery and commercialism, and making India independent of Lancashire. There is much to be said for this ideal. Climatic conditions impose a strict limit to the agricultural seasons in India and the spinning wheel might well find occupation for leisure hours. But handspinning alone cannot supply Indian requirements and the finer counts must still be imported. Meanwhile the agitation led to an increased output from Indian mills, and the foreign boycott sent up the price of home cloth and produced the anomaly of Bombay millowners subscribing to the funds of an organisation which advocated the abolition of machinery, yet somehow sent up the price of mill shares !

Of the anti-Government attitude a word must be said. It takes no account of the fact that the economic progress of India has been due in large measure to the Government, which, rightly it would seem, has done a great deal to develop Indian resources, so that foreign "stores" may be reduced on the import list and wealth may be produced by the export of Indian manufactures. The attempt to get back to mediæval simplicity represents a movement counter to all modern development. It is significant that the solution of nearly all the problems named now lies with native governments since the "transferred" subjects include public health, education, public works, agriculture, forests and fisheries, co-operation and industrial development. In other words, it is the Indian and not the British administrator who is going to determine future progress.

It might appear that Great Britain stood to lose, whatever happened in India. Yet this is hardly likely for some time to come. Whatever India may manufacture for herself her goods cannot entirely replace high-class articles from England. A Manchester merchant recently said that some of his best work, for which there was no sale in England, found a ready market in India. Much the same may be said of machinery and railway stock, while increasing development of India's resources will bring new needs The future prospects of British trade in India depend to a large degree on the adaptability of the British manufacturer. On the other hand, changing political conditions may result in insecurity and a consequent reluctance on the part of Englishmen to invest their capital in India, while it is not yet certain how far Indian resources can be left for development to the Indian capitalists. Some have gone so far as to suggest that the Indian "nationalist" will not do so much for India as the British have done, but without venturing to discuss this point it may reasonably be said that Englishmen can still render a great service to India, both in the political and in the economic sphere. There is a growing interest being taken by educated Indians in the management of the country's affairs and herein lies great hope for the future in spite of many apparently insoluble difficulties.[6] The problem will well repay very careful study by Englishmen, and particularly by geographers, and it is with the aim of stimulating such study that these points have been brought forward. At the worst they may result in some further enquiry into the resources of one of the most important parts of the British Empire and so help to an understanding of the economic development of India.

1. Moral and Material Progress of India for 1921, p. 195 This publication contains an account of the progress of Indian industries during the year 1921.
2. On the Mineral Development, see Records of the Geological Survey of India, LII, 1921, pp. 28-79.
3. The writer had the opportunity of seeing experiments of feeding famine-stricken cattle on cactus plants in 1919. The effects were good, although the conservatism of the native was a distinct factor to combat.
4. The percentage of the population of India receiving University education is about half as large as that of England and Wales, a very creditable state of affairs. But the total percentage of people receiving any education is only 3.42.
5. The Times Indian Supplement, Nov. 17, 1921.
6. The most serious is the problem of military defence. It is hoped to deal with this in a subsequent article.
7. The authority for most of the statements made in this paper will be found in the "Moral and Material Progress and Condition of India," issued yearly (H.M. Stationery Office). In addition to standard works such as the Oxford Survey of the British Empire (Asia, Volume II), the following will be found useful:—

   Sir V. Chirol. Indian Unrest; India, Old and New.
   G. Keatinge. Agricultural Progress in Western India.
   Morrison. The Economic Transition in India.

Travel Old and New. S. J. Looker. 23 x 14½ cm. pp. 472. O'Connor. 1922. 10/6.

This delightful anthology of travel should certainly be on the library shelves of every school, for it will be equally helpful to the teacher of English and the teacher of geography to allow scholars to imbibe their subjects unconsciously from it. It is pleasant to find that the collection starts with an extract from R. L. Stevenson on "The Wander Thirst," for no English writer is more necessary to the student of geography, and it is much to be hoped that those who read the various extracts from his works will turn to the works themselves and study such epics as "Across the Plains," or "Travels with a Donkey." Mr. Looker has not confined himself to any age or place, and there are extracts from Herodotus, from Chinese writers, from the works of poets and literary men, and from the fine scientific records of travel undertaken with a specific object, such as "Voyage of the Beagle" and "The Naturalist on the Amazon." We like the author's plan of giving in the contents list, which follows the foreword, the title of the book from which each extract has been taken, so that any reader whose fancy is stirred or whose curiosity is aroused, can readily read the extract in its own setting.

ACROSS THE EAST OF BELGIUM FROM ARLON TO BEERINGEN.

Notes on an excursion conducted by Prof. Paul Fourmarier of Liège University at the International Geological Congress in Belgium, August, 1922.

By Elsie K. Cook and Edith M. Coulthard.

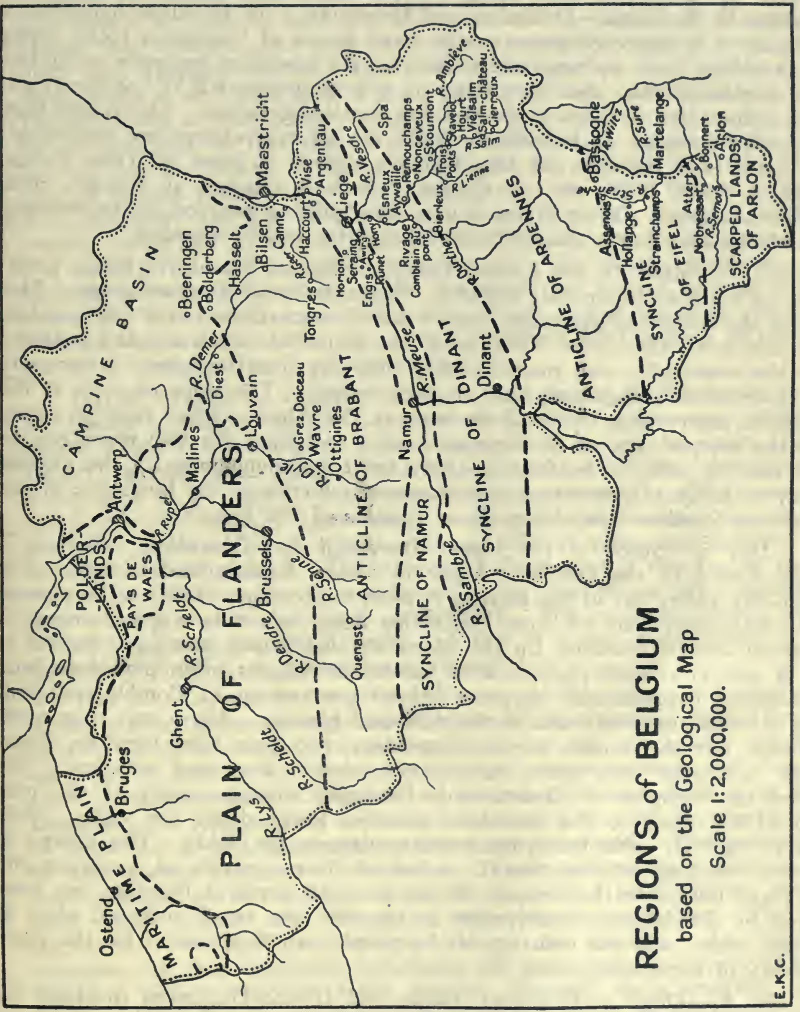
THE writers of these notes submit them in the hope that they may offer a useful holiday suggestion to members of the Association; and in doing so they would like to point out that geographers are welcomed as members of the International Geological Congress which is held about every three years, the next being in Spain. The excursions arranged in connection with the Congress afford an excellent opportunity of seeing the country under the ablest guidance; and the handbooks of all the excursions, supplied to every member, are most valuable books of reference. This excursion is described in the " Livret Guide " A1, " Traversée Orientale de la Belgique," by Messieurs Lohest and P. Fourmarier. Many countries were represented in the twenty-five members of the party, and the social life was most agreeable. The total cost for nine days was 375 francs or £6 5s., half fares on all the Belgian railways being kindly granted by the Government to members of the Congress. As Branch Secretaries of the Geographical Association we wish to take this opportunity of thanking M. Fourmarier for his great kindness and courtesy to two of its members and for the excellent way in which he organised the excursion, which in itself was a lesson in able management.

This tour may be made to cover all the chief regions of Belgium by going via Ostend and returning via Antwerp. These regions are well marked out on the generalised geological map on the scale of 1:1,000,000, where it will be seen that Belgium, like Britain, contains representatives of nearly every type of rock in a small area, and therefore has great diversity of surface. They are as follows:—

(1) Maritime plain with a narrow dune country along the sea, quaternary deposits.
(1a) Polderlands near Antwerp, mainly quaternary.
(2) Pays de Waes in some respects like the Campine deposits.
(3) Plain of Flanders, deposits resembling the London Basin.
(4) Campine—mainly Pliocene deposits.
(5) Anticlinal of Brabant, mainly Cretaceous and Tertiary resting on a large anticline of Silurian and Cambrian which appears in the bottom of some valleys.
(6) Sambre-Meuse Valley or Namur Synclinal Carboniferous rocks.
(7) Dinant Synclinal, Carboniferous limestone and Devonian Series.
(8) Ardennes Anticlinal, Lower Devonian and Cambrian Series.
(9) Eifel Synclinal—Lower Devonian.
(10) Scarped lands near Arlon—Jurassic Series.

In the appended notes these regions will be referred to by numbers only. The outward Journey via Ostend to Brussels crosses regions (1), (3) and (5), while the return via Antwerp includes (1a) and (2).

Day 1.—Arlon to Bonnert, Attert, Nobressart and Bastogne—Region 10 and contact with 9. Arlon commands a wonderful panorama of the scarped lands. It is a typical frontier town, built on lower Jurassic sands, more or less ferruginous, with limonite infiltrations which can be studied in quarries near the town. A fault at Bonnert puts these sands into contact with marls; to the N.W. on the main road from Arlon to Marche are the calcareous sands of Florenville and Metzert. Two Kms. from Attert Triassic rocks are found; the last village is built on Lower Keuper Marls and conglomerates. Near Nobressart we reached the contact of Triassic with Devonian Rocks. With these varied sources of soil, this is an agricultural district, quite intensively cultivated. Here, as elsewhere in Belgium, peasant proprietorship prevents extensive sheep runs; all possible land is tilled, and animals are fed only on waste ground and always tethered—occasionally we saw a woman leading a cow to feed along the roadside (a common sight in Belgium), busily knitting as she walked.



REGIONS of BELGIUM
based on the Geological Map
Scale 1:2,000,000.

Errata:—For Argentau read Argenteau; for Awiro read Awirs; for Ottigines read Ottignies; for Runet read Ramet.

Day 2.—Natural region 9. Bastogne to Martelange and back via valleys of Stranche and Sure, to study the Eifel Synclinal. The dip of the strata is towards the South in the N., vertical in the Centre, and towards the North in the S. of the Synclinal. Near Bastogne cultivation seems more intensive than on similar land in England. Several types of village were noted:—

(1) Hollange—village in a gap made by R. Stranche.

(2) Stainchamps—confluence of Sure and Stranche.

(3) Radelange (like Durham, but on lower ground) on river-girt peninsula of the Stranche.

(4) Martelange—double "street" town on the frontier. Famous for rose cultivation.

DAY 3.—Bastogne by train to Cierreux and Trois Ponts in middle of Anticlinal of Ardennes—Devonian and Cambrian. An excellent opportunity for study of a dissected plateau—the hard bands of Cambrian rocks stand out as ridges, cut by antecedent rivers. An excellent example of differential erosion is also seen in a band of Arkose quarried S.W. of the town, which stands out as a low ridge and has heath vegetation. The ridges here are mainly forested or heathland, while the alluvial valleys are cultivated. The Salm is a tributary of the Amblève, which it joins at Trois Ponts, thence it flows N.W. to the Ourthe, which it reaches at Rivage, near Comblain-au-pont. Trois Ponts is in a very striking position at the meeting of Amblève and Salm, amidst beautiful country mainly wooded.

DAY 4.—Study of the Lienne Valley. Regions 8 and 7. From Trois-Ponts by train to Stoumont, Bierlèux, Nonceveux and Remouchamps. This part of the Ardennes has many beauty spots—waterfalls, baths and grottos. The Amblève valley near Nonceveux has beautiful cauldrons and potholes near the waterfalls, and magnificently clear-cut river terraces. Nonceveux and other small villages are built on the terraces. The slope of roofs of the houses is interesting in the Ardennes, as the Alpine châlet type is mixed with the steeper type of N. Germany—near Stoumont the two types can be seen side by side. The train journey from Remouchamps up the Ourthe Valley to Liège is interesting, the immense quarries in the limestone of the Dinantian Syncline resembling those in parts of the Pennines.

DAY 5.—Study of the Upper Devonian and Dinantian. Region 7, in the Valley of the Ourthe. Liège to Hony, Esneux and Rivage. The trench-like valley cut in the plateau is most interesting. Life on the plateau seems here quite cut off from the valley floor, which is a great artery of communication; climbing up the steep wooded slopes, one is surprised to find a well cultivated plateau with numerous villages often placed in little coombe-like depressions. A point behind the station at Comblain-au-pont gave a wonderful panorama of the dissected plateau. There was a splendid meander, like the famous one at Chepstow; two clear river terraces, intensively cultivated with corn, barley, rye, clover, beet and potatoes. We visited the villages of Oneux and Fraiture, whence many of the men descend for work to the limestone quarries lower down the valley, while others, together with the women folk, cultivate the fields. The village of Oneux, standing at cross roads, is bult on river gravels of a terrace and has three pumps in the centre. Here, as in all parts of Belgium, we were struck by the intensive cultivation of the soil, the small unfenced plots of various crops, and the industry of the people, which accounts for the rapid recovery of these lands since the war.

DAY 6.—Liège to Engihoul, Engis and Horion-Hozément to study the Eifel fault and Synclinal of Namur, natural region 6. Liège, with its collieries and industries, compares with Sheffield and the Don Valley. We passed the iron, glass and zinc works at Angleur and Seraing (suburbs of Liège), saw the tip-heaps and coke-ovens that are the inevitable accompaniment of a colliery district; and in the ravine at Engihoul, on the right bank of Meuse, examined a very interesting cutting showing the Eifel fault. Several quarries were examined near Aigremont, where the dip of the rocks is as much as 70 deg. previous to bending under the Meuse Valley.

Day 7.—Liège to Visé and Tongres to study the Westphalian (Carboniferous) Cretaceous, Oligocene and Quaternary rocks. Regions 6 and 5. N. of Liège the road on the right bank of the Meuse traverses the coal measures to which the industrial district owes its importance. We stopped at Jupille to examine the gravel terrace 25 feet deep resting on the Coal Measures—one of two river terraces full of white pebbles much eroded, and covered with quartz and paleozoic rocks. There are many lime kilns between Argenteau and Visé. Visé was the first town visited, where the inhabitants are still in huts and the town still in ruins. At Haccourt the Meuse was crossed, and here the country abruptly changes and becomes more like Holland—flatter, with avenues of poplars and robinias. The chalk scarp is well seen from a point near Haccourt. While passing to the Dutch frontier at Canne there is an excellent example of a dry valley formed by the junction of two tributary valleys, the white roads at the bottom looking just like rivers. Passing to Tongres the scene is very like Holland—brick houses white-washed, contrasting with the stone houses of most of S.E. Belgium, and the people in clogs and pattens. Tongres, a market centre, stands exactly on the junction of the chalk with the oligocene sands, and quite an abrupt change is seen on each side of the town—the chalk typically smooth and treeless, while the sands are uneven and have mainly conifers. We visited some tile works which utilise the clay intercalated between the tertiary sands, also a very beautiful sand cutting to the left of the main road not far N. of the town.

Day 8.—Liège to Tongres by motor and thence to Beeringen to study the Campine, and on to the Anticlinal of Brabant at Louvain. Regions 4 and 5. This excursion gave a good opportunity to see the rivers Geer and Demer, whose level valleys contrast with those of the Ardennes. At Bolderberg is an island of pliocene deposits set on the Oligocene sands, which gives a splendid opportunity to contrast the Campine country with the other deposits, as it stands out as a hill of pines and heather in the midst of cultivated land. The colliery at Beeringen is due to the fact that under the Campine lie Carboniferous rocks that have been removed by denudation from the Anticlinal of Brabant. The existence of this coalfield behind the great port of Antwerp, so full of future possibilities in a less nationalist Europe, suggests many thoughts.

Day 9.—Louvain to Ottignies, Wavre and Brussels—up Valley of Dyle which has cut down through the deposits of the Tertiary Plain (Region 3) to the Cambrian rocks, resembling those of the Ardennes, making an inlier (or "fenêtre"). After seeing the contact between the Cretaceous and Cambrian rocks at Ottignies, we visited a disused chalk mine at Grez Doiceau; the long tunnels excavated here are now used for the cultivation of mushrooms, and enormous numbers are produced. The workings are 40 metres deep and cover 7 hectares. Wavre, where the Cambrian Rocks are visible, is an interesting market centre, with a brick church, the lower part made from the Diestian ferruginous sandstone. The usual dog carts are used for taking things to market. An interesting extension of this excursion would be to cross to the Senne Valley to Quenast, where eruptive rocks project through the Cambrian, making enormous quarries of porphyry, thence up the Senne to Brussels.

The Congress held in Brussels lasted nine days, and was accompanied by numerous social functions and excursions. Other long excursions were conducted after the Congress, covering nearly the whole of Belgium.

MERCATOR'S NET.

Rev. A. J. Potter, Reading University College.

IN the belief that the subject of Map Projections has more value for and hold upon those who can follow the processes of construction or calculation from beginning to end, an attempt is made in this paper to bring the familiar, but often imperfectly grasped, Mercator's Net within the range of such mathematics as a student of Geography may ordinarily be supposed to possess. This does not include Integral Calculus. It is our purpose to set out the process in a simpler manner without resorting to anything that may afterwards have to be unlearnt, and, indeed, by means which will be helpful in higher branches.

The accompanying diagram brings out, in the first place, the contrast between Mercator's Net on the right and the Central Cylindrical Projection on the left. The two are still often confused. They are similar in appearance, since both have a rectangular mesh, and they are identical as regards the parallel straight lines which represent the Meridians. The difference arises only in the spacing of the parallel straight lines which represent the lines of Latitude. There is increase polewards in both cases, but the increase in Mercator's Net is not so rapid, the 70th parallel being about the same distance from the Equator as the 60th in the Central Cylindrical.

The construction of the Central Cylindrical is simple, lines being drawn from the centre through points on the sphere to a cylinder, usually tangential along the Equator. The quadrant to the left of the line CN shows the process in section for a 10° mesh, and may be allowed to explain itself.

Mercator's Net, on the other hand, cannot be constructed in any such simple geometrical way. Hence it is preferable not to call it a Projection. The quadrant to the right of the line may nevertheless be useful as indicating the principle on which the distances of the Parallels from one another, and thus from the Equator, are found. It is divided, as in the other case, by radii at intervals of 10°. From the points at which these intersect the circumference, lines are dropped parallel to the axis, to meet the radius next below. If now, with dividers, we transfer these distances (such as AP and BQ) successively to a meridian, we shall have the arrangement represented along the vertical line (springing from E) immediately to the right. This is Mercator's arrangement in principle, from which the true procedure only differs in that the intervals must be very small, in strict theory infinitesimal. The total of the distances will then become infinite, so that the Pole and its neighbourhood cannot be represented.

As an intermediate step, along the second vertical line to the right, is given the result which would be obtained by taking 1° intervals. This is not very different from the true Mercator up to about 60°, but the Parallels still fall markedly short of their true positions in higher Latitudes. It is, of course, not easily practicable in this case to arrive at the result geometrically, but the lengths such as BQ can be calculated. Example:—

$$\begin{aligned} BQ = BZ - QZ &= CZ \tan 70^\circ - CZ \tan 69^\circ \\ &= CZ (\tan 70^\circ - \tan 69^\circ) \\ &= R \cos 70^\circ (\tan 70^\circ - \tan 69^\circ) \end{aligned}$$

where R is the radius, CB.

This is a somewhat arduous, though straightforward, task. It would be far more arduous for one minute intervals.

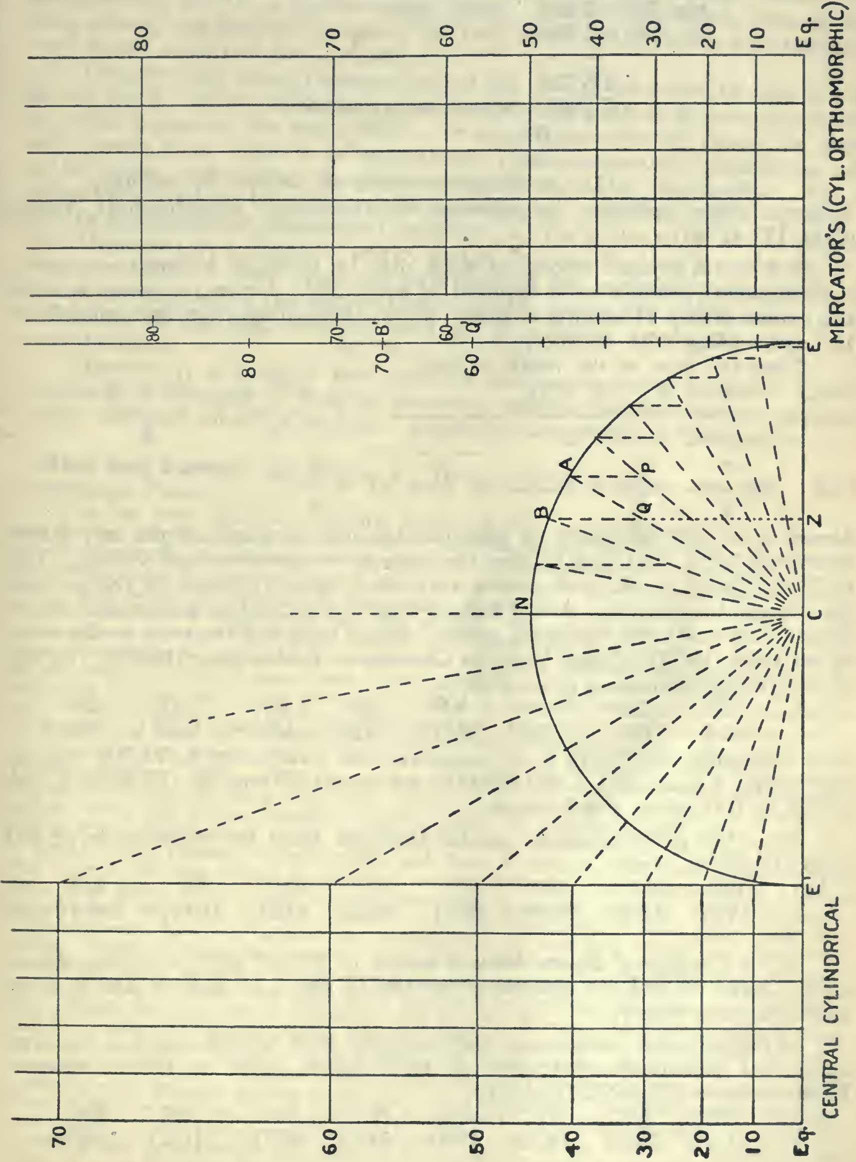
Another method of attack, however, presents itself here. For with such a small interval the radii CB and CA would be nearly parallel, so that CBA and CAB could be taken as right angles, and the arc AB as a straight line.

Then the angle ABQ would be complementary to CBQ; but BCZ is complementary to CB(Q)Z.

$$\therefore\quad ABQ = BCZ$$

$$\therefore\quad \frac{BQ}{BA} = \sec ABQ = \sec BCZ$$

This means that for *very small* intervals, the exaggeration of the distance between the Parallels is proportional to the secant of the Latitude. Thus a table of what are called Meridional Parts may be made by the



addition of secant values for small intervals. Theoretically, as has been said, the interval ought to be infinitely small, but practically, as our figures shew, an interval of one minute gives a very good result, up to at least 85°, beyond which the Equatorial Mercator's Net is rarely if ever drawn.

We are still faced with the forbidding task of summing some 5000 secant values; but this may be simplified by taking the mean value of the secants for each degree, and multiplying by 60, which gives practically the same result as adding the secant values by minutes.

Thus even at such a high latitude as 69°—70° we have:

$$\begin{array}{rl} \sec 70^\circ = & 2{\cdot}924 \\ \sec 69^\circ = & 2{\cdot}790 \\ \hline 2 \,|\, & 5{\cdot}714 \\ & 2{\cdot}857 \quad \text{Mean secant value} \\ & \quad\;\; 60 \\ \hline & 171{\cdot}420 \quad \text{Estimated total of secants by minutes} \end{array}$$

whereas actual addition by minutes in Chambers' Mathematical Tables gives 171·42 (4).

But a still greater saving of work may be made as follows:—

Suppose Parallels to be required at every 10°. Let m, n, o—u, v, w be the values of any 11 secants at every degree, beginning from one multiple of 10° and ending with another.

Then the sum of the mean values

$$= \frac{m+n}{2} + \frac{n+o}{2} \text{———————} + \frac{u+v}{2} + \frac{v+w}{2}$$

$$= \frac{m}{2} + (n + o \text{———} + u + v) + \frac{w}{2}$$

Hence it is only necessary to take out the first and last of the set, divide their sum by 2, and add to this the sum of the intermediate values. The total multiplied by 60 will give a very close approximation to the sum of the secants by minutes. About half-an-hour's work in this way with a three-figure table gives the following results, which do not differ even in the units figure from the Meridional Parts in Chambers' Tables (pp. 418-426), except at 80°, where Chambers gives 8375·3.

Lat.	10°	20°	30°	40°	50°	60°	70°	80°
	603·1	1225·1	1888·4	2622·8	3474·5	4527·5	5966·5	8378 1

Now, assuming the Earth to be a sphere with a radius of 6,371,300 metres, and taking a scale of 1 : 100,000,000, we get 11·12 mm. as the scale length of 10° or 600′ along the Equator.

Thus the scale distances of the Parallels from the Equator work out proportionately as:—

Lat.	10°	20°	30°	40°	50°	60°	70°	80°
	11·18	22·71	35·00	48·61	64·39	83·91	110·58	155·27 mm

With Chambers' figure the last comes to 155.22 mm., a trifling difference. Even at 85° our method gives 199.72 mm., as against 199.51 mm. from the truer figure.

In order that a comparison may be made with figures based on the true spheroidal dimensions, we give a table taken from p. 166 of Karten-Entwurfslehre (Zöppritz-Bludau).

Lat.	10°	20°	30°	40°	50°	60°	70°	80°
	11·11	22·58	34·82	48·38	64·13	83·62	110·27	154·95

A note on the term "orthomorphic" may usefully be added. On the globe, as is well known, the longitude distance for a given interval decreases in proportion to the cosine of the Latitude. If then the longitude distances are everywhere made equal on the map (as is necessarily the case where the Meridians are parallel straight lines, crossed at right angles by straight lines to represent the parallels), this must give an exaggeration in the opposite sense, i.e., proportional to the secant of the Latitude.

Thus at 60° on the globe the longitude distance is half that at the Equator. But with a rectangular net they are made equal. Hence the exaggeration at 60° is 2, the secant value. But on Mercator's Net, as has been shewn, the latitude distances for very small intervals are also exaggerated as the secant of the Latitude.

Thus for very small distances round any point, the scale, though it may be too large, will be exaggerated in the same proportion in both directions, or, what comes to the same thing, the angles immediately round the point will remain true. This is called orthomorphism, a property sometimes said to be more interesting mathematically than useful practically. But in Mercator's Net we have an application of great practical value. For if a line (a loxodrome or rhumb-line) be drawn on the globe so as to cut successive Meridians at a constant angle, and if this line be then transferred to a Mercator Chart, it must come out as a straight line, since the orthomorphism of the network keeps the angles true in detail, and a line which cuts a close succession of parallel straight lines at a constant angle can only be a straight line.

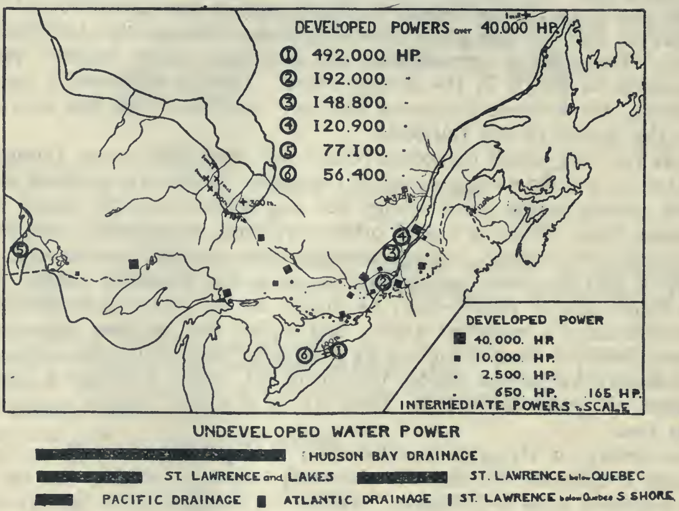
Conversely, a straight line between two points on a Mercator Chart, represents a constant (if not the shortest) course, and this can be approximately followed with a Compass. Hence its usefulness in Navigation.

Maps and Survey. By Arthur R. Hinks. 5¾in. x 8¾in. pp. 258. 12/6 Cambridge Press.

It is ten years ago since the first edition of this now well-known book appeared, and in the meantime each of the subjects included in the title has been the object of much experiment, and a large amount of such experimental work has been done by Mr. Hinks himself. The war gave a great stimulus to the production of new and better maps, and solely on account of that phase of surveying and map production it has become necessary to supplement the first edition. We gather that the present book is a temporary expedient until such time as the whole can be re-written. The first 201 pages have been re-printed without alteration. Certain additions and corrections—none of the latter is serious—have been collected into a new chapter. Probably the most important addition here is an alternative method of resection with the plane table, which gives a direct solution. The new developments in connection with levelling, as set out in lines 1 and 2, p. 207, already seem to need some bringing up to date, as the work is rather further advanced than the paragraph seems to suggest (see Geographical Teacher, Summer, 1921). It is true that the entire set of new levels will not be marked on the O.S. maps for some little time. Chapter X, "A further Chapter on Maps," is entirely new, and collects together a great mass of most interesting items, such as: Flying Maps, Conventional Signs, Map Reproduction, Work of P.C.G.N (see end pages of Geographical Teacher, Autumn, 1922, and Page 1, Spring, 1923), and Map Analysis. The value of the last section is admitted, but the author himself suggests that a single sheet of a series may or may not be representative of the value of the whole series, and as over 30 more or less different series are analysed, it is a great pity that "circumstances have not allowed the reproduction of any new maps" in the second edition. Some of those analysed are not easily obtained, and an analysis is of much diminished value in the absence of the map concerned. Chapter XI, "Maps and Survey in War," deals with The Grid, Survey for Artillery, Map Supply during the War, Sound Ranging, Flash Spotting, and Enemy Survey. Much has already been published under the several heads, but Mr. Hinks has carefully summarised and correlated the available material. It is a most attractively written chapter, and will appeal to a very wide circle. Chapter XII, "New Methods of Survey," is very much more technical, as it sets out all the recent work on Photographic and Stereoscopic Surveys. Some of this work has been published in the "Geographical Journal," particularly with regard to the stereo-autograph of Von Orel and Zeiss, but its inclusion in the present volume is a distinct advantage in a text book which will rank as the standard summary of all branches of survey and map work. W.E.W.

NOTES ON A WATER POWER MAP OF EASTERN CANADA.

By H. A. Matthews.
Geography Dept., London School of Economics.



Index Stations with Developed Powers over 40,000 h.p.:
(1) Niagara, (2) Grandmére, (3) Shawinigan Falls, (4) Montreal, (5) Winnipeg, (6) Hamilton.

Fig. 1 Water Power of Eastern Canada.

1. The actual developed water powers are shewn by a system of proportional dots (except those powers of over 40,000 h.p., where the large dot required would have obscured detail). In every case the data were taken from the "Canada Commission of Conservation—Water Powers, 1918."

2. In determining the value of the Estimated Water Powers the results of the Commission of Conservation, Water Powers of Canada, 1911, were used. This Commission everywhere based its calculations on the minimum flow of rivers. In areas where the water run-off per square mile was known, the available horse-power of any fall was calculated as the product of the effective height through which the water fell and the weight of water passing the fall in a given time. The result obtained was then reduced by 20 per cent. in order to compensate for loss due to mechanical imperfectation in water power plant. In cases where the run-off was not known an index figure for run-off taken from an area similar in topography and river régime, was applied to the area in consideration. The results obtained may thus be taken as a reasonable and modest estimate of available power.

3. The border of the Canadian Archean Shield has been drawn on the map (shewn as a continuous line). It is interesting to note that in general the greatest development and the greatest available amount of power is situated either on the shield itself (an area of extremely broken river drainage) or on the edge of the shield and the softer Palæozoic rocks has produced a distinct line of fall. Note especially the northern border of the shield, where in the Nelson River area there is a theoretical power of 6,000,000 h.p.

4. The greatest development is shewn to be concentrated on the St. Lawrence and Lakes drainage above Quebec. The undeveloped power

reaches a maximum on the Hudson Bay drainage (10,000 h.p.—on the map the rectangles are proportional to the available h·p., e.g., Hudson Bay drainage 10,000,000 h.p., and Pacific drainage 1,500,000). Outstanding undeveloped falls are shewn by means of a + against which is given, in figures, the estimated power.

5. The large number of small power stations should be noted—120 out of a total of 237 stations are quite small (less than 500 h.p.). So that apart from the larger industrial stations we have a considerable local and domestic use of electrical power generated by water.

6. In general it should be noted that, although there are undoubted theoretical reserves of power of considerable magnitude, such factors as distance from market and requirements of water for purposes other than water power, will operate against any rapid extension of power and even against the ultimate use of that power. Such a warning is especially applicable in the area of the Hudson Bay drainage, where physical conditions combined with distance from population, will long delay any large development. Further, notice should be taken of the fact that Canadian water power will necessarily meet keen competition from cheap American coal and from steam-generated electric power.

NOTES ON A WATER POWER MAP OF WESTERN CANADA.

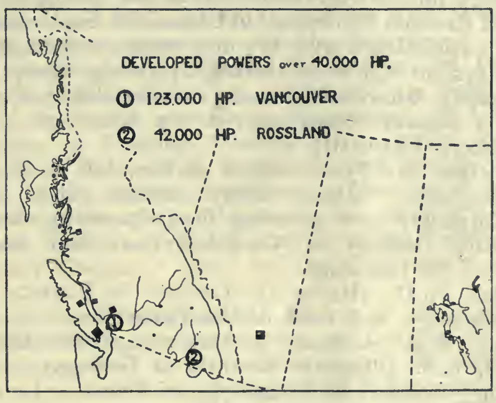


Fig 2. Water Power of Western Canada.

The water powers are again shewn on the same scale and basis as on the map of Eastern Canada. The most noticeable feature of the map is the large area without developed water power. Practically the whole area between the Cordillera and the Archean Shield is without a power station. In this area climate and topography militate against the presence of water powers. Climatically the markedly seasonal character of the rainfall renders the river régime far too variable, while the soft rock of which the prairies are formed does not produce sufficient irregularity of river profile to supply the concentration of river power into falls as on the Archean and Palæozoic Rocks of the East. The presence of very large and accessible deposits of sub-bituminous coal in the southern prairie provinces should make up for the lack of water power there, provided development accompanies a really efficient system of coal distillation and of power distribution.

In British Columbia is an area of sufficiently rugged relief and steadier river régime (Winter rain, Spring snow, and Summer ice melt). Here large powers are developing in connection with the lumber industry, e.g., at Ocean Falls.

A NOTE ON THE DEPARTMENT OF GEOLOGY AND GEOGRAPHY IN THE NATIONAL SOUTH-EASTERN UNIVERSITY, NANKING, CHINA,

Kindly communicated by DR. COCHING CHU, Head of the Department.

ALTHOUGH the Government Teachers' College of Nanking, China, was founded in the year 1915, courses in Geology and Geography were not given until the autumn of 1919. By that year instruction was given in the Political and Historical Geography of China in the Division of Literature, History and Geography. Geology, Physical Geography, and Meteorology were added to the curriculum the next year. From the very beginning the class rooms in the courses of Geography and Geology have been well filled; 50—60 in the elementary classes and 20—30 in the intermediate classes.

This rapidly expanding institution, however, had so enlarged its scope in the meantime, that the Chinese National Government deemed it fit to expand the College into a University. So in the spring of 1921 the founding of the second national University in China, the South-eastern University, was effected. In compliance with the new need involved in this expansion, the old division system had to be thoroughly re-organised. The subjects of Geology, Geography, Meteorology and Palaeontology were grouped together to form a separate department in the School of Arts and Sciences of the South-eastern University.

At present there are five members of the staff in the Department of Geology and Geography. About twenty students out of the total number of 400 in the University (not including the preparatory class and the High School) are taking Geology or Geography as their major work. The faculty consists of the following:—

Coching Chu, Ph.D. (Harvard)—Lecturer in Physical Geography and Meteorology, and head of the Department.
Y. L. Tseng, E.M.—Lecturer in Meteorology and Economic Geology.
W. M. Fee, B.S. (Illinois)—Lecturer in Geology.
Y. S. Wong—Lecturer in Geography of China.
T. H. Lee—Assistant Meteorologist.

The following courses are offered for the Spring Term (March—July), 1923:—Physical Geography, Geography of S. China, Geography of N. America, Historical Geography of China, Climatology, Mineralogy, Topographic Surveying, Cartography, Historical Geology, Field Geology.

Owing to its recent origin, the Department of Geology and Geography is very meagre in its equipments, especially in books and mineral collections. With the excepion of Chinese old writings on the subject of Geography, there are only 500 books, reprints, and illustrated pamphlets on the modern aspects of Geography and Geology, mostly in Chinese, but a few in English. About 700 specimens of rocks, minerals, and fossils are exhibited in the departmental museum. They were mainly collected by the faculty and students of the department in the vicinity of Nanking, and in the neighbouring provinces. The instructors found it utterly inadequate for the class work in mineralogical and geological laboratories, and have been obliged to order specimens from abroad.

At present all the geological and geographical work is done in the University Building, which has been long outgrown. There is a very urgent need for a new building, where modern facilities for laboratory works in Geology, Geography, Mineralogy, and Petrography can be set up, and where a spacious museum for the constantly increasing collections of minerals and rocks can be accommodated. The University has already raised a sum of two hundred thousand dollars for the purpose of erecting a new science building, in which the department of Geology and Geography hopes to be housed after it is finished.

The lack of accurate maps is another handicap to the teachers of Geology and Geography in China. The department is striving to compile a new set of maps (of a convenient scale) of the Republic of China, both from the maps published by the Chinese Ordnance Survey and from foreign sources. The density of population in China has always been a vital problem to the Republic and to the world at large, and yet it has never been accurately charted. The recent publication of census made by the Department of the Interior in Pekin, the Chinese Post Office, and the China Continuation Committee, all within the last five years, throws much light on the question, and has induced the department to draw maps showing density of population for the different provinces of China proper, and for the surrounding territories. A few of the provinces have already been charted, and the result of the investigation will be embodied in the form of a monograph to be published in the near future. Since the autumn of 1921, a meteorological station, where daily observations of maximum and minimum temperature, pressure, rainfall, relative humidity, wind direction and velocity, cloudiness and kinds of clouds, and the state of weather, are made, has been established in connection with the department. Besides exchanging weather reports with the Central Observatory of Pekin by telegraph every evening, the observations are published in a local paper. The first annual report is now in the process of preparation. It will contain a paper on "The Climate of Nanking," tables giving mean monthly and mean annual temperature and rainfall during the last twenty year (since 1903), and a summary of the weather conditions in Nanking during the year 1922. The Board of Faculties of the University has already decided to establish a meteorological observatory at the summit of the Polaris Hill at the back of the University Campus. Sites for the observatory have already been provided.

The Historical and Geographical Society of the University came into existence in May, 1919. It has now a membership of 73, consisting of students, graduates and faculty members of the University. Regular meetings are held twice a term, during which lectures on history, geography and allied subjects are given. Since the autumn of 1921, the Society has published a Journal, which, quarterly at first, was changed into a monthly last September. The magazine is known as the Journal of the Historical and Geographical Society of the South-eastern University.

The attention of botanical geographers may be called to a paper by H. A. Gleason, entitled, "The Vegetational History of the Middle West," in Vol. XII of the Annals of the Association of American Geographers. This branch of study has been developed rather specially of late years in America, and students of Willis' "Age and Area," as well as human geographers who try to think out the changes in vegetational covering of regions they study, will find Gleason's paper both valuable in itself and useful for its references to a good deal of recent work in the New World. Many of the American ideas should be taken up, *mutatis mutandis*, on this side of the Atlantic, and a good part of Gleason's paper is devoted to purely general considerations. The destructive power of man's fires is emphasised on lines similar to those worked out by Perrier de la Bathie for Madagascar (see this Magazine, Vol. 12, p. 65). Vegetational belts are also shown to have moved backwards and forwards (not always north and south) with alternation of glacial and non-glacial conditions.

REVIEWS.

The Glory of the Pharaohs. A. Weigall. 286 pp. Thornton Butterworth. 1923. 15/-.

As Inspector General of Antiquities for Upper Egypt, Mr. Weigall has had ample opportunities of studying the remains of ancient Egyptian splendour at first hand, and emphasises this fact through thirty-one introductory pages. In fact, the whole book seems to be a little more on the side of an exposition of the author's experiences and of his views on morals and ethics and proper methods of study than on that of a description of the Pharaohs and their glory. But for those who, in spite of Mr. Weigall's dictum that " the ease with which long journeys are now undertaken has made it possible to seek information at its source in almost all the countries of the world," yet have not the money with which to purchase that ease, his book will be of great value. It teems with local colour and first hand descriptions of Egypt to-day as well as of Egypt of the long ago. There are some fine illustrations, including one of the inevitable Tutankhamen, and a particularly attractive photo, taken by the author, of the mummy of Prince Yuaa. Versions of one or two Egyptian folk tales are given, which children will find delightful, and the book is one which will be well worth adding to the library for upper forms.

The World About Us. O. J. R. Howarth. 19 x 12½ cm., pp 94. Oxford University Press. 1922. 2/6.

This little book is in the same series as " The Peoples of Europe " (Fleure) and " The Expansion of Britain " (Kermode), reviewed in previous numbers. The series is an interesting experiment in the compression of wide subjects to a compass that will be acceptable to the general reader who wants to get an outline suggestion of what are the problems under discussion. It is inevitable that to treat of environment, geographical distribution, migration, transport, political states, and the relation of environment to history in less than a hundred small pages, is no easy task, and it is inevitable that certain generalisations will arouse a good deal of criticism, since space forbade a discussion of the data on which they are based or of the modifications and reserves, which should be stated. But the book is full of useful suggestions, and the thoughtful introduction will be much appreciated by teachers of geography. Chapter 7, dealing with the local application of environmental study, and discussing a part of the O.S. map of the Isle of Wight and a part of the O.S. map of Kent, will certainly help those who are attempting to introduce the regional method into their schools.

Travels in Eastern Tibet. Eric Teichman. 25 x 16½ cm., pp 248. Camb. Univ. Press, 1922. 25/-.

This book has a double appeal, for while it records travel in the fascinating border region between Tibet and China, and gives descriptions of the striking natural regions in the high mountainous district where the Mekong and Salween and the Yalung and Yangtse take their rise, it also records political events in the district. Mr. Teichman, as an officer of the Consular Service in China, offered his services as mediator in the difficulties which arose out of the hostilities between Chinese and Tibetans on the border in 1918. The writer was evidently fitted, both by his long residence in China and by his ability to see that there was much to respect in both the Tibetan and the Chinese point of view, to undertake the task. The book is written clearly and concisely, and there is a certain combination of terse description and shrewd comment that reminds one of the style of Cæsar. There are numerous illustrations and a folder route map, which is based on the author's prismatic compass traverses, adjusted at certain places to the astronomically determined latitudes of earlier travellers, whose names are given. It is a serious and dignified contribution to our political knowledge of the difficulties of one acute problem of the Far East, and to general geographic knowledge of the Kam country. Teachers are invited to take special note of this valuable study.

We have received from Messrs. Longmans Green a new edition of " A Smaller Commercial Geography," by G. G. Chisholm and J. H. Birrell, brought up to date on the same lines as the " Handbook of Commercial Geography," recently noticed in our columns. 5/-.

Messrs. Fisher Unwin have brought out a new edition of " The Balkans," by William Miller, in " The Story of the Nations " series, with a new chapter containing their history from 1896 to 1922.

Owing to an oversight no proofs were sent to the writer of the following reviews in the last number. Certain misprints should be corrected (p. 53).

" Business Geography." E. Huntington and F. E. Williams. Line 3, for " grade " read " trade." Line 19, for " labour " read " later."

" English Coastal Evolution." E. M. Ward. Line 1, for " Mr." read " Miss."

Iranians and Greeks in South Russia. By M. Rostovtzeff, Hon. D.Litt. Oxford, at the Clarendon Press, 1922. Demy 4, pp. xvi + 260. Collotype frontispiece, 32 plates, 23 figures in the tent, and a folding sketch-map of South Russia. Cloth gilt, £4 4s.

This is a book of rare and original quality. Previous writers on the antiquities of South Russia, however well versed in the archæology and history of the country, have approached its problem, as Dr. Rostovtzeff observes in his suggestive preface, rather as Hellenists exploring a remote colonial region of the Hellenic world, than as denizens of that region itself, experienced in its age-long control over the life and work of man and primarily concerned to analyze that control, whether exercised upon approximately indigenous inhabitants, upon invaders from Sarmatia or from beyond Ukraine, or upon coastwise settlers with Mediterranean antecedents and traditions of art and society. What Dr. Rostovtzeff has attempted is, in fact (as he himself says), to "write history, with the help of archæology," "using the archæological evidence" (that is) "in the same way as I should use, and have used, in this book written documents or literary sources."

Now it hardly needs saying, that in doing this, Dr. Rostovtzeff has come very near to an even rarer thing, namely, to write geography with the help of archæology. For his method, as may easily be guessed, is at bottom geographical; it is a study of distributions, and conclusions from them. Most of these distributions are those of works or handicraft and artistry classified by style (supplemented, of course, by stratigraphical evidence of many rich finds) into series representing development through the centuries, but also distributed, as their recorded find-spots show, in accordance with the distribution, temporary or relatively permanent, of those who owned and used them. Consequently, in a region for which there is little direct historical evidence,—and what little there is comes mainly from Hellenic historians, or at best through Hellenized natives in the coast towns—it is nevertheless possible to reconstruct, in outline at least, whole kingdoms and confederacies of native states, to watch their aggressions on each other, their commercial relations with the Greek colonies on their seaboard, their even more delicate interchange of artistic ideas and techniques with those colonies, and their eventual creation of a Bosporan State, neither wholly Greek nor fundamentally Scythian, which played a far more important part in the life of the ancient world than has been generally supposed; for not only did its peculiar constitutional arrangements find numerous imitators, but its vigorous decorative art, especially in metal work, profoundly influenced that of the Hellenistic world, and all the while it was to the peculiarly successful dealings between the Bosporan Greeks and their partially Hellenized neighbours inland, that the Græco-Roman world owed one of its securest sources of that "Pontic coin," on which so much of the economic and social structure of that world rested.

To realize the significance of these tersely written, close-packed pages, needs therefore the equipment of a geographer as well of an ethnologist and antiquarian. One could have wished, indeed, for rather fuller preliminary description of the stage of this drama, the wide horizons, sharply marked river-courses, and peculiarly shaped coastline of the lands between Carpathians and Caucasus; for more explicit discussion or at all events description—for much of this went on till within living memory—of the curiously complicated ethnology, sedimentary agricultural folk occupying the river margins and extending their cornlands over the steppe, while nomad pastoral tribes, based on the grazing grounds, dominated, harried, or more usually farmed in their turn these human flocks, and built upon their subservience courts of great splendour and political dominions with a policy and a culture of their own. Herodotus, almost our earliest authority for Scythian life, hit off with a phrase this age-long distinction between "royal" and "farming" Scythians, with the further qualification, due to Greek exploitation of the river-routes seaward, that some Scythians farmed their cornlands "for maintenance," others for sale, growing, that is, a surplus for export against oversea goods. Thus Greek art work here was an exotic, and found a real, and after centuries an eventually victorious rival, in the decorative style of the Scythians, and later of the Sarmatians who intruded on them from beyond the Sea of Azov, as the Scythians themselves had intruded on their Cimmerian predecessors, not long before the first contact of Pontus with Ægean Greeks. What this Scythian and Sarmatian art, and the civilization which it betokens, really was, is one of the main problems, which Dr. Rostovtzeff has set himself to solve. His solution is given in the title of his book, for he believes that the successive westward movements into South Russia, to which allusion has already been made, were essentially the northern trans-Caucasian, trans-Caspian counterpart of those which brought Iranian-speaking peoples into Persia, Media, and Eastern Armenia, perhaps even further afield in smaller bodies injected into Syria and Asia Minor. As he shows good reason for connecting important elements in the population and culture (especially in art, administration, and religious cults) of the East Balkan lands, and even of the Middle Danube and North Western Asia Minor, with characteristics of historic Scythia, the wide importance of this aspect of his work will be obvious.

Still more important and of interest more especially to the historian and geographer of mediæval Europe, is his affiliation of the early mediæval "beast-style," so well worked out already by Salin, Nils Aberg, and others, for the European world of the migration period, to a Sarmatian and eventually Scythian ancestry; the Goths, who entered South Russia from the North-west, almost devoid of higher culture or representative art, having acquired from Sarmatian neighbours and auxiliaries quite as important elements of the arts of peace as of the military machine which broke the frontier-defences of the Roman Empire.

From these selected topics some idea may be gained of the wide scope and the suggestive and stimulating quality of this remarkable book. To do it justice it must be studied in conjunction with Dr. Minns' great compendium of the archæological material, in his "Scythian and Greeks," to which Dr. Rostovtzeff pays high tribute on more than one occasion. But most of all must it be studied in conjunction with the map and the gazetteer, for though its story ends with the first establishment of durable Slav states in the ninth and tenth centuries, A.D., it is full of geographical implications which are eloquent of what follows. It is, indeed, not an archæological history only, but an illustration of geographical method applied to human distributions, and a rare example of the scientific use of imagination.

Place Names and History. A. Mawer. 38 pp, 21½ x 14 cm. Univ. Press, Liverpool, 1922. 1/-.

This is a summary of a lecture given by Prof. Mawer to further the interests of the survey of English place-names, with which he has identified himself so wholeheartedly. He quotes one of the great Maitland's fine sayings concerning the map of England. "It is," he said, "the most wonderful of all palimpsests," and if we are to interpret it, we must distinguish the age and activities of the various scribes who had a hand in it. In this work he acknowledges, with finely appropriate tributes, the services of Skeat, Ekwall, G. B. Grundy, and other scholars, and his little book is full of hints which should greatly help teachers, the whole country over, to make vivid and personal their teaching about their own regions and the whole of the home country. As Prof. Mawer is anxious to get into touch with teachers who will collect place names, and as he helps them in many ways, it is specially important that this little book should circulate among teachers.

The Problem of China. Bertrand Russell. 260 pp, 14 x 20½ cm. London: G. Allen and Unwin, 1922.

The greatest political problem of the present day is that of the Far East, where the Chinese people, a fourth of mankind, are undergoing experiences undreamt of in their history of forty centuries. The steamship has put an end to their long isolation, and industrial capitalism is clamouring for its prey. Russell writes as an admirer of the moderation of the Chinese civilization, with its preference for beauty rather than tidiness and for peace instead of power, its contempt for the soldier and its enthusiasm for the scholar. In the course of the book he contrives to say many hard things of Western Europe and America, but he might have expanded a little his rather brief reference to the value of medical work, of agricultural advice, and of the influence of some of the more enlightened missionaries who have worked to develop a synthesis of the idealisms of east and west. It is interesting to note Russell's evident confidence, or, perhaps, rather his chastened hopes, concerning the young China movement, which may preserve Chinese civilization for the world if the White Peril can be staved off without a descent to sordid militarist imperialism. China is to him rather a region of civilization than a political unit, and he rightly points out that, in emphasising the difficulties and so-called wars between different parts of China under a dozen separate governments, we are apt to forget that Europe, with its smaller population, suffers from more than a dozen governments, the inter-relations of which are worse than those between the governments in China.

He hopes for increased Chinese control of railways, industry and commerce, and especially for the completion of the Peking-Hankow-Canton line. This line, he thinks, will increase the importance of Canton and diminish that of Hongkong. We agree with the former, but doubt the latter statement.

There is not much in this book to give an insight into the life of the Chinese farmer, and he is 80 per cent. of the population; and there is little about the differences between different parts of China. For the former topic, at any rate, the reader should study Prof. King's valuable little work, "Farmers of Forty Centuries." But, in spite of these limitations, the book is worth reading as a criticism of what Russell would call our western barbarism in its relation with a civilization which, up till now, has known how to assimilate all its conquerors, and which seems likely to make Manchuria an area of Chinese culture, whatever the political domination there may be. Prof. Roxby's articles in this magazine should be studied along with "The Problem of China" in order to get a comprehensive view; they are still available in collected form as a reprint.

Essentials of Sociology in Relation to Economics. P. Geddes. 106 pp, 25 x 16 cm. From the Indian Journal of Economics, Vol. III. 1922.

Here we have a restatement of well known views of one of our Vice-Presidents about current problems. Needless to say, he puts in a strong plea for the study of geography and anthropology, linked together, in their relation to social and economic problems, and he asks for special attention to studies of the regions round about us. It is a pleasure to acknowledge the influence of Prof. Geddes on geographical and other lines of study in our generation, and to recall that Prof. Herbertson always did so with special warmth. He was one of the chief pioneers of summer schools, and turned them towards accumulating permanent results of studies of the districts in which they were held. These results might sometimes be books, papers, maps, and so on, sometimes legislation looking towards social betterment, and those results have been far greater than might appear, for the ideas his vivacious personality disseminated have worked as leaven in minds very differently constituted, giving effects which only close observation could trace back to their cause.

Inca Land. Explorations in the Highlands of Peru. H. Bingham. 23½ x 15 cm., pp. 365. Constable. 1922. Price, 24/-.

This book is written by the Director of the Peruvian Expeditions of Yale University and the National Geographic Society, and will be found invaluable by those teachers who want first-hand descriptions of Peru as it is to-day. In addition to this the author's well-known interest in the history of the region leads him to work out the history and prehistory of the places he visited. The first two chapters give a vivid account of the ascent of Mt. Coropuna, undertaken out of scientific curiosity as to whether it was higher than Mt. Aconcagua. Although it turned out to be 21,703 feet above the sea level, and therefore some 1,000 feet lower than Aconcagua, yet the author and his party had the satisfaction of being the first to reach its summit, and to take accurate scientific survey of it. The geographic world is much indebted to the group of American scientists who are carrying out these studies of Peru. A five page bibliography of the published results of their work gives the reader some idea of its extent, and the student of Peru an opportunity of getting up-to-date information about it. There are numerous illustrations based mainly on first hand photos, and a reproduction of a particularly interesting 16th century map of Peru and view of Cuzco. Scholars in the upper forms who have been attracted by stories of Pizarro and the Incas of Peru will find the book altogether fascinating, and it should certainly be on the shelves of every geographical library.

Principles of Geography, Physical and Human. E. G. Skeat (Mrs. Woods). 432 pp., 19 x 13 cm, 150 illustrations. Oxford, at the Clarendon Press, 1923. 7/6.

The fact that this book was begun with the advice and help of Professor Herbertson assures it a welcome for his sake, while the acknowledgment to Prof. J. L. Myres in the introduction is a further helpful indication. Following the Herbertson sequence it discusses the earth as a planet, and then proceeds to climate, physical geography of earth and oceans with emphasis on land forms, the distribution of vegetation, of animal and of human life, development of human life in various environments, such as various kinds of forests, grass lands, deserts, tundras, river valleys, shores of inland seas, and so on. Early occupations, spreads of culture, phases of human concentration, growth of cities, migrations, man in relation to both Atlantic and Pacific, all receive notice. A welcome feature of the book is a series of bathymetrical maps of oceans and seas, with a discussion of their ridges, plateaux and deeps; the chapters on land forms also contain a good deal of fresh and interesting material. It is a difficulty in books of this small size that many topics have to be skimmed, but Mrs. Woods has often contrived to give the uninitiated reader an interesting glimpse of the progress of thought on the subject touched, and a reference or two which the student may follow up if he will. The bibliography at the end is well selected on the whole, and the index is a good one. Small criticisms might be offered of various points, but this would not bring out more than differences of opinion such as are bound to exist among students. The book is a valuable one, which can be recommended to the serious attention of teachers. We hope it may have a large circulation and receive attention in a few details, especially after perusal of Prof. Myres' contribution to the Cambridge Ancient History, in subsequent editions. Brunhes' Geographie Humaine and George Adam Smith's Historical Geography of the Holy Land should be in the bibliography. Another point should receive attention in a subsequent edition. The great development of what we may call the Indo-European civilizations receives a great deal of attention, but that of Chinese civilization receives only occasional mention; its inherent richness and its immense potentialities make this omission a very unfortunate one.

Begriff, Stellung und Einteilung der Geographie. Dr. Albert Leutenegger. Justus Perthes, 1922. 22½ x 14½ cm., pp. 157. In German. 3 gold marks.

For those who are interested in discussions on the content, meaning and scope of geography, this little monograph will be of great importance intrinsically, while for those who want to find out what geographical publications have been appearing in German recently, and what has been the general trend of German geographic thought in the last few years, its copious bibliographical footnotes will be invaluable. While everyone may not agree with the author's conclusions, yet his conscientious discussion of the origin and progress of the study of geography, of modern methods of scientific geographic research, both practical and theoretical, of the relations of geography and history, of its proper position in the faculties, and of its relation to astronomical, geological, and anthropological researches is a serious contribution to modern attempts to make towards unity of aim in geographic principles. The author's erudition, both classical and modern, is very evident, and has given him opportunities of approaching the subject from varied angles.

The Romans in Cleveland. F. Elgee. 26 pp and map. 22 x 14.5 cm. Pub. F. Elgee, Commondale, York, 1923. 2/8, post free.

Those who have enjoyed and profited by the valuable book on the "Moorlands of North East Yorkshire," which Mr. Elgee wrote some years ago (and we hope teachers of geography know and use that book) will welcome this little book from his pen, and hope it may be the precursor of others. This little work is a good example which might be followed by authors in many districts. Mr Elgee gathers together all the data from present and past place names, finds of coins, inscriptions, roads, and comes to the conclusion that the Romans occupied and controlled Cleveland far more completely than has often been supposed. They reached Cleveland on their way north, the earliest coins being of Nero and Vespasian. The first important stations date from the second century. The growth of the Saxon peril dates from the fourth century, and the Romano-Britons seem to have put up a strong defence and to have held off the invaders for a while. Mr. Elgee describes in some detail the scheme of Roman coastguard forts dependent upon the greater camps inland, and in this section he breaks what is almost fresh ground.

One is glad to notice that Mr. Elgee recognises the existence of pre-Roman civilization among the Brigantes in Cleveland. The understanding of this point is most important for students who have been brought up on the fable of woad-tinted naked savages; they should study the articles of Mr. Willoughby Gardiner in Archæologia Cambrensis, and of Messrs Wheeler and Sayce in the Transactions of the Cymmrodorion Society.

Die Deutschen im Polnischen Korridor. A Penck. Reprinted from the Zeitschrift der Gesellschaft für Erdkunde, Berlin, 1921, No. 5-7.

Prof. Penck has sent a copy of his article and a set of 1:100,000 maps showing the methods of the linguistic census of 1911. We do not think we need go over the political controversies about the nett affinities of this disputed district beyond expressing an opinion that a large reserve is necessary in assessing the value of any map of linguistic distributions. How are we to decide where to classify an individual; we need to know him very intimately before we can judge whether his definitive desire is to be classed with one side or the other unless he is really, and not only ostensibly, monoglot. Those who know the more or less bilingual districts of Wales or of Alsace will appreciate the subtlety of the problem. The ordinary language map, colouring an area according to the percentage of its people who speak one language or another has its pitfalls, for it sometimes gives wrong impressions by masses of colour spread over very sparsely populated areas. This error Penck's maps sought to avoid. A colour dot was placed near a village for every ten persons who spoke a language. If the population was too large to use this method, squares were used in various sizes, the smallest square denoting 100 persons. By this method not only the general distribution, but also any contrasts between rural and urban were brought out. That this method is worthy of attention, and of application to the study of other mixed distributions, is obvious, and Prof. Penck's direction of the work is a guarantee that it was carried out with care. The value of the results, as in all statistical work, depends largely on the value of the original data, and here we have to maintain a certain scepticism from our knowledge of analogous work in Wales and elsewhere. Another subtle difficulty has its roots in the selection of colour. Red is Polish, blue German, green is mixed speech, a dark purple is Kaschube or Kassube, the last being taken to be a language deeply distinct from Polish. It is to be feared that the eye of most observers looking at the map will unconsciously treat the last two colours named rather with the blues than with the reds, though the way in which they are marked in some places seems to indicate that the map makers did not wish to get this effect.

Lands of the Thunderbolt. Sikkim, Chumbi and Bhutan. Earl of Ronaldshay. Constable. pp xvii + 267. 1923. 16/-.

When Lieutenant Governor of Bengal, the author took several journeys into the three countries which are barred off from that province by the outermost ranges of the eastern Himalayas. Sikkim is the most mountainous country in the world, and the other two countries almost rival it, and this vivid narrative of travel in the regions will be of very great use and interest to teachers attempting to give a description of life among the mountains. The book takes its title from the fact that the thunderbolt is the emblem of the hierarchy of the somewhat corrupt form of Buddhism prevalent among the inhabitants, and the book itself has the twofold aspect of a book of travel and a useful description of Buddhism. Like all Messrs. Constable's travel books, it is well illustrated, and there is a valuable folder map at the end.

Climatic Changes. Ellsworth Huntington and S. S. Visher. Yale and Oxford University Presses (Mr. Humphrey Milford). 1922. xviii + 329 pp, 13 figs., 23.5 x 16 cm. 17/6.

In whatever measure we agree or disagree with Prof. Huntington's point of view, every student welcomes his periodical restatements of his views about changes of climate. Each book on this subject bears traces of further thought as well as of the author's vigorous imagination ever reaching out further into the unknown. It is one of the great merits of this school of research that its hypotheses are steadily adjusted to meet constructive criticisms. Thus the view sometimes developed from Huntington's work that there is some regular alternation of wet and dry cycles alongside of an increased desiccation of the earth is now given up. Wet and dry periods are claimed to occur, as everyone agrees, but the arguments of Gregory (Geogr. Journal, 1914) and others are allowed to prevail against the idea of greater desiccation in each successive dry period.

In this book the authors try to show that the earth's present climatic variations are correlated with changes in the solar atmosphere. One star after another has approached the solar system closely enough to set the atmosphere of the sun in such commotion that great changes of climate have occurred upon the earth. These have led to destruction of only a part of the contemporary life on earth, and with this has invariably gone a stimulus to other types, producing ultimately greater organic diversity. This influence on climate is claimed to be, in large measure, an influence on atmospheric pressure and on storm tracks, and a good deal of use is made of the observations on climatic phenomena of regions near or within the grasp of ice-sheets. The authors allow a good deal of weight, as a subsidiary hypothesis, to the view developed of late, especially by de Geer and C. E. P. Brooks, that changes of distribution of land and sea influence climate, and on this point there are some acute remarks, though we hardly know enough as yet of the distribution of sea and land in former geological periods to argue with much confidence.

The phenomena of the Great Ice Age (Pleistocene) are discussed and claimed to be such as they should be if a main and general cause was an unusually high degree of disturbance of the sun's atmosphere, but at the same time difference of level of the land is allowed some power and Brooks' work is treated with some appreciation. The authors apparently do not follow Brooks in his account of post glacial changes in general, save that, even more than he, they accord much weight to O. Pettersson's statement of a case for periods of great climate stress in the 14th century A.D., and about the 4th century B.C.

It is interesting that this book allows much weight to Gregory's arguments in favour of uniformity of historic climates based on the discussion of the date palm around the S.E. Mediterranean in antiquity. The authors apparently do not now think that climatic variations in historic times have been great enough to cause great vegetational changes, save, one is given to understand, along critical zones like desert margins. For these latter this book maintains the view that ruins with water conservation systems do occur in places where nowadays such water conservation would not give adequate results. The claim, in older books by Huntington, for the recognition of a dry period about 300 A.D. is abandoned, and this is a clear gain from every point of view. One regrets that attention is not given in this work to the heavily-documented paper by Dr Leo Berg (**Klimaveränderung,** in Penck's series of Geographical Monographs) which claimed to show constancy of climate during historic times; probably the reply to Berg would be to concede a measure of constancy and yet to claim variations sufficient for Huntington's general thesis, but this would be difficult to argue in the particular case of the steppe margin in central Eurasia.

There is no likelihood that this book marks the final expression of the vigorous thought of so stimulating a worker as Huntington, and, if we sometimes disagree, and often, at least, hesitate to agree that evidence is sufficient, we can nevertheless admire the advances and the readiness to reconsider details which characterise this book. The co-operation of S. S. Visher and of a number of other American scientific men of high worth in the preparation of this book gives it an enhanced interest.

Sisal Economics. Major L. A. Notcutt. 28 x 21½ cm. Messrs. Bale and Danielsson, 1923. Paper cover. Reprinted from "Tropical Life." 7/6.

This is an attempt "to discuss technically the more difficult problems in the subject of sisal production," and students of economic geography will find it a most useful monograph. It treats the subject under the following sections: "The Economic Botany," "Agricultural Problems," "Harvesting and Transport of Leaves," "The Sisal Factory," "Consideration of all the factors to obtain Maximum Economy in a new Undertaking." There is an interesting discussion of the relative possible futures of East African sisal fibre and Mexican sisal (henequen). On p. 27 are latitude and rainfall data, which will enable students to map the limits of sisal production in East Africa. The attitude of mind throughout is that of a certain type of modern business exploiter of tropical possibilities, and there is no consideration of the ultimate economy of tree-felling in tropic lands. The author's attitude towards the unfortunate natives who do not fit into his scheme of quick profits is positively naive in its querulous indignation, e.g., "Unfortunately East Africa is infested with tribes which are too indolent to work." That the climate of East Africa may make even the European exploiters who infest the tropics almost as indolent, is recognised by the author when he says, in considering the supervision costs of white men, "But no matter how excellent the capabilities of the staff, if their energy and efficiency are permitted to be neutralised by tropical lassitude due to mental, moral and physical ill health, the production will fall off and the costs rise."

The Cambridge Ancient History. In eight volumes. Vol. 1, xxii + 704 pp., 24½ x 17½ cm. 13 maps and several tables. Cambridge, at the University Press. 35/-.

This volume of the great Cambridge series is of special interest to geographers, for it contains a valuable summary by Professor J. L. Myres of our knowledge of mankind in early prehistoric times. This contribution has had to compress itself into about 110 pages, so that it is unable to give the full arguments in support of several of its interesting suggestions, but those who have kept fairly level with the literature of the subject will know from the way he puts things that Prof. Myres has not missed much.

For the author the Mediterranean is, naturally, the centre of life, and he discusses its physical evolution and that of its faunas and floras at various periods in order to lead on to interesting theories about the association of various ancient types of man with various faunas.

Many four-handed and many four-footed primates were forced to withdraw to Africa and Malaya if they kept their arboreal habits when the advent of cold in Europe restricted the distribution of sub-tropical forests. But one primate, two-handed, two-footed, accommodated itself to life in the open with a career of pedestrian adventure and manual exploitation, probably at first in the parkland and grassland sequel of the retreating forest. Some early types of this primate were pushed out with the forest, and for Myres the Tasmanians, beyond Malaya, and the Bushmen, Vaalpens and Strandloupers of S. Africa are homologous survivals at the ends of the pressure lines. He thinks of the standard negro type and the standard Mongol type of man as secondary adaptations to very special regimes, and though here his want of space makes him omit important points, his suggestions are courageous and profitable; he follows with a good and careful discussion of European man and his physical relationships with other types, past and present, the world over. In studying distributions he is forced to give special consideration to the ice age, and here he accepts the idea of a southward shift of the belts of climate, and follows this out to conclusions of value to several branches of study. A map of conditions at the Ice Maximum in Europe is bold and useful. He also does this for the subsequent northward return of the climatic belts, and includes in the rapid summary ingenious and original suggestions at every turn. This essay, in spite of its brevity, is thus a notable contribution to the understanding of man in relation to his environment in early times, and so to the illumination of the problem of geographical dstribution of the races of man. A notable success is achieved in a map of Neolithic Culture Distributions in Europe, and it is clear from the map that it is the work of one who is a geographer studying archæology and anthropology with his attention ever focussed on the life of man in varying environments.

Prof. Myres' section is followed by several others, which have much geographical interest. Dr. Cook on the Semites, Prof. Peet and Dr. Hall on Egypt, Dr. Langdon and Mr R. C. Thompson on Mesopotamia, and Mr. Wace on the Ægean, will all interest students of geography, but in their articles the geographical interest is necessarily subordinate, and we must forego comment beyond a special note of appreciation of Dr. Cook's summary of fundamental facts agout the Semites.

Altogether this is a book that serious teachers of geography should see, and if they are interested either in the question of races of man or in that of the Semites and the Near East, they will find this volume a book to buy. The summary bibliographies for each chapter add to the book's value.

A Summer in Greenland. A. C. Seward. Crown 8vo., pp xiv + 100. Camb. Univ. Press. 1922. 7/-.

Professor Seward here gives us an account of his recent travels. The purpose of his " Summer in Greenland " was to collect as representative a set as possible of fossil plants for the British Museum. His base was the Danish Arctic Station on Disko Island, lying off the N.W. coast of Greenland, about latitude 70 deg. There are numerous well-chosen illustrations and two sketch maps, and it is evident from the illustrations that the author's bias is towards botany and geology. The second chapter on Greenland as a land of sunshine dispels some preconceived notions on " Greenland's icy mountains," and incidentally gives a most instructive chart simplified from one published in " Greenland " for 1921, vol. i, p. 162, which shows the air temperature, the percentage of days on which the temperature fell below freezing point, and the rainfall in inches and mm. Teachers who want vivid details for young children will find the book useful, while older scholars will probably read it with interest. The author touches on, but has not space to discuss in detail, some of the unsolved problems of the region, as for instance, the question of the original home of the Arctic floras and the assumption that a land connection has existed in post-glacial times between East Greenland, Iceland, and the Faroes, and refers to an article in the Journal of Ecology, vol. x, No. 1, 1922, in which Holttum summarises the present state of knowledge from an ecological standpoint.

La Vie Pastorale dans les Alpes Francaises. P. Arbos. Paris, Colin, 1922. 720 pp. + maps, 25.5 x 16.5 cm. 28 fcs.

This book offers us an opportunity to pay a tribute to the active Institute of Alpine Geography at the University of Grenoble, where Prof. Blanchard and his students and friends are advancing the study of our subject by careful work infused with imagination. The present book takes its place with the best books of the French geographic tradition, and will be studied with interest by all who are interested in man among the mountains, all the more because there is a classified bibliography of 414 books and articles, and the index is better than in many other books of the kind. Its author is now Professor of Geography at Clermont Ferrand, and is developing there a scheme of regional research.

The scheme of the book may be summarised as follows. The argument opens with a survey of soil, climate, topography of the high pastures, problems of forest growth and destruction, and of extent of cultivation, and this section is illustrated by maps showing relations of pastures to total area and to area of cultivated land. As the canton is chosen as the unit the maps are sufficiently detailed to have considerable value. There follows an account of the local evolution of property, communal and private, of the arrangements for hay cutting on the high pastures in former centuries, and the survivals and modifications of the practice nowadays, of the old-time scheme of life when each district lived mainly on itself, and the newer scheme with its increased needs so often supplied from distant sources. The beasts themselves get a long section of the book, with regional discussion of the southern forelands of the Alps as mainly a land of small beasts, and of the wet parts of Dauphiny and Savoy as lands of large beasts, and of various other regions as " mixed." Savoyard life has 100 pages devoted to it, but the treatment of the south is shorter. The last part of the book deals with Transhumance, and is a welcome addition to the literature of the subject which was discussed at some length in a recent number (Geographical Teacher. No. 55, Autumn, 1919, C. L. Walton). A short but attractive chapter describes the buildings and their distribution, both the more permanent houses and the temporary shelters and cheese factories on the high levels being considered. The last subject treated is the modern commerce of the pastoral region.

The general conclusion of the book is that the modern development of communications has led the people of the Alps to modify their mode of life from the scheme under which they lived on their own resources. They have become more specialised as regards rearing of cattle, and in this matter have learned to depend more than of old on the exploitation of food crops in the lower lands and less on the high pastures, though the latter continue to be used, especially in those parts which get liberated from a snow covering in spring. Population of the Alps has declined seriously, and mechanical improvements are reducing human labour, the organisation of wire ropes and pulleys for taking the high-pasture hay down being a typical example of labour-saving as compared with the old system of mules with drags or sledges. None the less transhumance continues, because summer pasturing is the only way in which the wealth of mountain grass can be utilised, but the transhumant flocks and herds, on the move, say, from Arles to the Alps, are taken through the zone of arable land by train.

Might one invite some geographer to take this book, and any available accounts of the Swiss Alps, and to work out thence a comparison and contrast of the various schemes in force? It should make a most interesting article, towards the preparation of which the Office of the Association would be glad to give assistance.

Malaya. R. O. Winstedt. xii + 280 pp. Many illustrations and one folded map. 22½ x 14½ cm. London: Constable and Co., 1923. 12/-.

The preface to this useful book of general reference explains the shares taken in the work by a number of specialists collaborating with the learned editor, to whom Mr. C. O. Blagden has also given help which is duly acknowledged. The book thus ranks as a work of considerable authority on a region for which we do not possess too great a supply of works. It is a collection of information written out as briefly as may be, and so is valuable for reference rather than for continuous reading. To appreciate the interest and value of some of the statements and, much more so, to offer criticisms, one would need to be well read in the numerous papers and books listed in the bibliographical appendix. One wishes that the writer of the chapter on agriculture had told us more about the rubber planting, which has transformed the peninsula in recent years, and had given some statistics of the crop, and that the climate section had been illustrated by maps at least of rainfall distributions throughout the year. The folder map is useful for its place names, but it is only politically coloured.

Nyasa, The Great Water. Ven. W. P. Johnson. 19 x 12½ cm. pp 204 + folder map. Oxford Univ. Press, 1922. 7/6.

This little study of the people among whom he has lived and worked for so many years by the Archdeacon of Nyasa, of the Universities Mission to Central Africa, is well worth putting on the shelves of the school library. It is so clearly written that scholars in the junior as well as the senior forms could read it with interest. The descriptions of native agriculture and the difficulties that beset it are particularly vivid. We may quote from p. 54 a description of a woman's struggle to keep the baboons from her Indian corn field. " In her torn bark-cloth garment, rushing between the stalks of corn, she and the baboons might appear not unlike. From early dawn nothing but baboons helping each other to carry off grain, nothing but trying to chase them off. They often sleep in the tall straight mseza tree, and when they see a leopard, run up to the top." Even when parties of natives, with dogs or nets or bows and arrows, attack the baboons they are not always successful in driving off these enemies of the young crops. There is a thoughtful chapter in which British responsibility for the present conditions of the native settlements is discussed from the following all too often forgotten point of view. " The Alolo, moving west from him (i.e., the white man) fell upon the Yao, and then the Ololo and the Yao together, armed with firearms they had got from the Europeans, fell on the Nyasas. The Gwangwara on the war path by the lake side were like the last of the bricks knocking each other down in a child's game: the English had knocked down the first far away south."

Grundzüge einer Physioklimatologie der Festlander. W. R. Eckardt, Gebrüder Borntraeger, Berlin. 1922. 5/-. (In German).

Dr. Eckardt, who is in charge of the meteorological observatory at Essen, has published during the last six years various papers dealing with rainfall, pressure distribution, cyclones, and other subjects of kindred interest. This book deals very briefly in the first chapter with the general causal outlines of the main climatic features of the globe, and then goes on to study in some detail, Europe, the Mediterranean, Asia, Africa, Australia, North America, and South America. There is a full and most useful Bibliography appended. Dr. Eckardt mentions in his introduction that the book is intended for those who have had a fairly good grounding in the general principles of climatology, and indicates the general tenor of the work when he states that Rainfall is of overwhelming importance, not only for human industries, but for life itself. A great deal of emphasis is laid on the causes of variations in pressure distribution, and the author's familiarity with observations on actual atmospheric conditions, and with recent researches into cyclonic data, is in evidence throughout the book, and adds to its practical value. The book forms a useful scientific and analytical supplement to Kendrew's descriptive " Climates of the Continents," and is a valuable contribution to a study which is as yet only in an introductory stage. Financial conditions in Germany have made it impossible to illustrate the book as the author had wished, but numerous detailed maps of pressure distribution not easily obtainable elsewhere are given. The contrasts and discrepancies between the map given on page 96 of Kendrew, based on the Climatological Atlas of India and that given on page 69 of Eckardt, based on Blanford, Hann and others, each of which purports to give the distribution of pressure and wind in January in India, make the student realise how much need there is for more data and more detailed study of such problems. There are some suggestive remarks on typical climate regions, e.g., Eckardt gives it as an essential character of an oceanic climate that autumn rains are heavier than those in the spring. He gives as a main reason for this the intensity of cyclonic poleward movement of the trade wind due to the excess of water heating over land heating, which reaches its maximum in autumn.

Education in Africa: A Study of West, South and Equatorial Africa by the African Education Commission, under the Auspices of the Phelps-Stokes Fund and Foreign Mission Societies of North America and Europe. Report prepared by Thomas Jesse Jones, Chairman of the Commission. 19 x 26 cm. 323 pp. Phelps Stokes Fund, 297, Fourth Avenue, New York. Numerous illustrations and ten maps.

The introduction states that "the main object of this Report is to give to all interested in improving the status of the natives of Africa definite data as to educational conditions and needs in the southern, western, and equatorial sections of the continent." But it achieves much more than this, for the first five chapters discuss the aims and methods of education, and offer constructive criticism with a breadth of vision and honesty of purpose that should make the book take its place as a classic for students of education. A few quotations will show the spirit of the Commission and its power to put its finger on essentials.

(Page 10). "None can question the sincerity of the missionaries or their noble devotion to the welfare of the people. The defects in their educational program, so far as they exist, have usually been due to their conception of education . . . . . ." "In thus limiting education to class-room instruction in books, missionaries were following the ideals prevailing in the home country. In recent years there has been a decided enlargement of the field of education in Europe and America, and missionary education is necessarily being influenced by the change. It is recognised that the school has definite responsibilities to the community. Its influence must make for improved health, effective industry, helpful recreation, sound character, and a spirit of service."

(Page 12). "A strange but all too common weakness of educational endeavour in Africa has been the lack of co-operation among the three groups representing European and American civilization. Too frequently missions, governments, and commercial concerns have worked in their respective spheres without adequate consideration for one another. The participation of the Natives has naturally been even less than that of any of the other groups."

(Page 16). "The adaptation of education to the needs of the individual and the community is increasingly emphasised in the recommendations of American and English educators . . . . . School programmes should prepare the youth to deal wisely and effectively with the problems of their country and generation."

(Page 17). "Other natives have realised at the end of their school courses that their training did not fit them to meet any of the definite needs of the community except possibly clerical activities."

(Page 18). "the use of environment, preparation for home life, and the use of leisure time."

(Page 19). "It is useless to teach the laws of sanitation and hygiene in the classroom when they are disregarded in the arrangement of buildings."

(Page 20). "The overwhelming majority of the Africans must live on and by the soil, but the schools make very little provision for training in this important element for life. Next to the effective uses of the soil the most important activities are the simple handicrafts required in the kraals and villages."

(Page 21). "Boys as well as girls must be considered in planning the influences that are to form habits and attitudes, and to mould the youth for effective participation in the making of homes."

(Page 22). "Schools should endeavour to formulate a policy with regard to the clothing of their pupils."

The attitude of the writers might be thought to be that of a strong advocacy of vocational education, but careful reading removes this possible misconception, though one feels that it would not have been amiss to enlarge on some phases of education which get rather scant reference. In the education of the future leaders of African life one hopes that special attention will be paid to the study of what may be called, broadly, social anthropology or anthropogeography. It is not so much the particularities of different rites and ceremonies which should receive close attention, it is rather the varying relations of peoples to their environments, their activities, their ideas of land tenure, and so on, that should be discussed.

Contracts between Europeans and indigenous peoples of various regions, especially in the tropics, seem destined everywhere to raise difficulties as to property in land. Sir Frederick Lugard and his colleagues in Nigeria evolved a very wise modus vivendi, which the increase of skilled cultivation appears already to be modifying. It would seem to be most desirable that studies of this complex question in many other parts of Africa should be undertaken, and that African thinkers should play a part in their advancement; we may otherwise miss a great deal that would help understanding between African and European. Studies of this kind will usefully amplify the suggested course in geography (p. 61).

The writers of the book adopt a hopeful attitude as to the betterment of climate following drainage schemes and exorts at sanitation, and they refer with some fervour to the beauty and interest of African scenery and to the possibilities of the African people and their adaptation to developing world-conditions.

The book gives useful and very interesting statements of fact about the various regions of Africa (West, South and Equatorial) visited by the writers who formed a Commission of Enquiry, and these statements include details of educational systems and their institutions; this last point makes the report valuable to any persons who think of taking posts in Africa for a time in order to enlarge their experience.

L'Empire Britannique. A. Demangeon. viii + 280 pp. 19 x 12 cm. Paris, Colin. 1923. 7 francs.

Professor Demangeon is well known to geographers for his fine book on Picardy, and now he has given us an interesting survey of the British Empire and its problems at the present time, all the fresher because it comes from a thoughtful citizen of the great republic which is so deeply attached to the idea of the unitary state, that is, to a scheme of government widely different from the one underlying our schemes of autonomy within the empire.

He is concerned primarily here with the study of contacts between people possessed of material, intellectual, and financial equipment, full of enterprise and free of mind with other people living under the power of tradition, ill equipped, and, till recently, isolated from general world movements of thought. The facts that hardly a single British citizen lacks personal relations with distant lands, and that hardly any commercial man the world over lacks relations with some part of the British Empire, make that Empire a subject of special interest to the student of humanity. It has modified racial distributions, it has enormously developed European supplies of raw materials, it has developed world trade, and now it has made representatives of distant but associated lands sit at Versailles and Geneva, helping to decide the problems of the world after the war, and many of these cardinal facts are, as the author says, far too little understood by members of other States.

Prof. Demangeon insists on the heterogeneity and the ubiquity of the Empire and on the scattered distribution of its parts. Scattering is a factor of disaggregation, heterogeneity seems to make full assimilation difficult, ubiquity gives multiplicity of problems and makes friction inevitable, and uniformity and logical policies impossible. Yet the Empire holds together, and the author emphasises the importance for this of Britain's maritime policy and of Britain's multiple points of control around the shores of the oceans. To him the Indian Ocean is primarily a sort of British Mediterranean. The difficulty of heterogeneity can be met, in his opinion, only by increasing doses of " liberté, égalité, fraternité " to other peoples, even of tropical stocks. The difficulties due to ubiquity seem to him to require first and foremost naval and commercial strength and skill. It is clear that for him the problems of heterogeneity are the deepest, and when one reflects that the three most populous constituents of the Empire are India, with about 315 millions, the British Archipelago, with over 47 millions, and Nigeria, with nearly 17 millions, one cannot dissent from his position. To the power of Scotland he pays tribute again and again, as when he says that however American Winnipeg may be on week days, it becomes Scottish on Sundays, and he is equally alive to the vital influence of Oxford, Cambridge, and, in lesser degree, other homeland universities, on the strange agglomeration which persists so energetically, though logical argument could so easily prophecy its early decline.

We have not detected in the book any touch of hostility or any feeling other than one of kindly interest in one of the biggest and strangest of modern human facts. Careful as M. Demangeon has been to keep up to date, the process of change has left him behind the times here and there, but we note with interest that he has devoted a lot of thought and a good deal of space to Hongkong, which was hardly touched in a recent English book on the British Empire. Victoria, Hongkong, has now in some senses outstripped all other ports of world trade owing to its importance as a gateway to China. Ireland does not receive special treatment in this book. The historical introduction to the book is rather weak.

It should be of interest to know that a number of works on British matters is appearing in France—L'Inde britannique (Chailley, 17 frs.), L'Inde d'aujourdhui (Metin, 7 frs.), La Colombie britannique (Metin, 18 frs.), Les nouvelles sociétés anglo-saxonnes (Leroy-Beaulieu, 7 frs.), La formation sociale de l'Anglais moderne (Descamps, 7 frs.), L'Education et la Société en Angleterre (Leclere, 2 vols., 14 frs.). All these are published by Colin. It is thus possible to get an interesting view of ourselves by our clever neighbours in a series of books for a little over one pound at present rates of exchange. If any members of the Association have a difficulty in getting French books, the Central Office will help with information if a request is sent accompanied by a stamped addressed envelope.

The Great Capitals. Vaughan Cornish. 296 pp. 22½ x 14 cm. Two folder maps. London: Methuen, 1923. 12/6.

A book by Dr. Vaughan Cornish is bound to arouse interest among geographers, as he has the gift of focussing his wide reading on the problems he takes up without letting that wide reading interfere with his originality of thought. In this book he tries to analyse the characteristics which have led certain cities towards a glittering destiny as famous political capitals, and his survey extends literally from China to Peru, that is, he does not follow a too common tendency to think of history as merely the history of Europe and the Mediterranean. Every chapter of his book will furnish an enterprising teacher of historical geography with interesting contributions to the personal syntheses he must build up if he is to teach effectively, and will furnish him with a good deal of matter for critical thought. There is so much scope for personal difference in estimation of values that no two persons can be expected to take quite the same standpoint; the reviewer inclines to think that Dr. Cornish is inclined to emphasise strategic and military administrative considerations a trifle heavily, but neither disputes the weight of these factors nor their special importance in the case of the empires of conquest, which are the main subjects of Dr. Cornish's study in this book.

The order of treatment is China, India, Persia, Italy and Constantinople, France, Germany, other European countries, America, Japan, and so back to the Far East, whence the survey started. The aim is to show the three natural categories of capitals, which are Storehouses, Crossways, and Strongholds. The first is fundamental, for it is the world's storehouses of natural wealth that determine the importance of Crossways and Strongholds. A far reaching crossway at or near a storehouse is often a capital; a mere stronghold can rarely keep the metropolitan function, as Dr. Cornish shows. Another aspect of a Crossway is that it may bring together people of diverse origins and traditions to build up together a centre with understanding of different outlooks, and it is hardly fanciful to think of Rome as the meeting of Etruscan, Latin and Sabine, learning from their conjunction the art of making other conjunctions, which have, in so many cases, outlasted the Empire that was the occasion of their birth. Dr. Cornish considers that in political geography the great capital has as an outstanding character a forward, as distinguished from a central site. When the Roman Republic emerged from localism to take its place as the Mediterranean organiser, it had to depend on seaways, however remote sea-work had been from her previous tradition. And as Dr. Cornish argues well, Rome, with Ostea, was well enough placed from this point of view to continue in the metropolitan role which was already her historic right. He sees in the transfer of the capital to Nicomedea and then to Byzantium (Constantinople) an answer to the call for a forward site, and one may agree with him and still remember that the crossing from Asia to Europe has an immense importance of its own, that showed itself first in the third millenium B.C., with the rise of the earlier city on the site of the later Troy.

Dr. Cornish makes an interesting attempt to explain the changes of position of Chinese capitals on the basis of his principles, and achieves a good measure of success, though he, as well as the reader, remains in some doubt as to estimation of what really was a " forward site " at different times in Chinese life.

We are indebted to Dr. Cornish for his discussion of Susa and of the Karim basin as comparable in civilization to lower Mesopotamia, but, of course, smaller. He is thus led to look upon Babylon, Nineveh and Susa as a triad.

Dr. Cornish's discussion of Paris is specially interesting, as he distinguishes its first rise in Merovingian time from its second rise under the Capets along with general agricultural development. Has he noticed that something of its agricultural wealth is due to local climatic facts of the early Capetian royal domain, with its low, but nevertheless sufficient, rainfall and its consequent rich sunshine? On p. 119 in this discussion Salogne is a misprint for Sologne. He quotes with approval Gibbons' famous appreciation of Charlemagne, who so clearly recognised the danger of the N.E. frontier of Gaul and made Aix la Chapelle his capital. Had that effort been continued we might have had a Franco-German capital city in the end, one which might well have saved Europe from its perennial trouble; the factors of the change back ultimately to Paris are worth working out.

One of Dr. Cornish's most original contributions is his isothermal map, showing that in the golden days of Rome and China an isothermal line (about 45 deg.—50 deg. mean actual annual temperature) divided the region of cities and organised governments (to the south) and the region of tent dwellers and wanderers to the north. Readers of Matthew Arnold will remember how strikingly he works out this contrast in his Sohrab and Rustum. Dr. Cornish's argument that civilization progresses much more slowly across a steep than across a more gentle isothermal gradient will be accepted by most students. There are physiological factors involved in several of these cases, notably, it would seem, in the fixation of the limit of Japanese expansion northward.

The Historical Geography of Canada. Part II. Hugh E. Egerton. Third edition. Oxford Press. 1923.

This series is so well known that the need for a third edition will create no surprise. The only new features in it are a chapter on "The Dominion of To-day," which is purely political history bringing affairs up to date, but making no geographical comment of any sort, and a footnote to a map on p. 326 explaining the effect of the Boundaries Extension Act of 1912.

From Golden Gate to Golden Sun. Herman Norden. Witherby. 287 pp. + index. Illustrations and Folder Map of Siam and Malaya. 15/-.

This breezy narrative of travel and sport in Siam and Malaya is eminently readable. The author records life as he saw it in Sarawak, Bangkok, the Wilhelmina Mts., Batakland, the Padang Highlands, Nias, and various other places in the region. There is no attempt in the book to make any fresh contribution to scientific knowledge, but as a travel book giving descriptions of other ways of life it should be useful to teachers of geography.

Some Economic Needs of Ireland. G. J. T. Clampett. 24 pp, 18 x 12½ cm. Dublin: Talbot Press. 6d.

An address by Principal Clampett discussing the position of Ireland in commerce matters, with running comments based on comparisons with other countries. The special resources of Ireland, he finds, are its position on the globe, its climate, its harbours, and its waterways; these lead to an export trade in farm produce, of which he gives some details. He urges that too much is exported in the raw state, and he then discusses the problem of industrial power, and hopes that both peat and running water will be increasingly used. He concludes with comments on labour power and capital power.

Annals of Archæology and Anthropology. Vol. 9. 1922. 132 pp and 63 plates. 26½ x 18½ cm. £1 1s.

The renewal of this journal after the war period is evidence of the vitality of the University of Liverpool and of the energy of the editor, Professor Peet. The wealth of illustration is a point one must praise in these days, when expenses of special paper and printing run high. Among the numerous articles we may note some which bear upon geographical studies. There must be few students of human distributions who have not at some time pondered over the problems of distribution of great stone monuments. Mr. E. T. Leeds has made a personal study of these remains of antiquity in Spain, where they continued to be venerated down to historic times. Indeed, readers of Mr. Peake's article in a recent number of "Folk Lore," will be inclined to think that in Spain, as in Brittany, they still have their place in popular rites and beliefs. Leeds favours the idea of an almost autonomous development of the great stone monuments in Spain, and is thus very far from accepting Prof. Elliot Smith's views on this controversial subject. His map of the distribution of megaliths and of directions of influence exercised by Spain is stimulating, and, in some details, provocative.

Mr. Woolley's article on Asia Minor, Syria and the Ægean is a plea for more consideration for the influence of Asia Minor on the ancient life of the Eastern Mediterranean. The longest article in the volume is that by F. Ll. Griffith on "Ancient India."

Maps of Copper and Iron Distributions in the Japanese Empire. Imperial Geological Survey of Japan. 1922.

We are indebted to the I.G.S.J. for two interesting maps, which should be known to teachers working on the geography of the island empire and needing to supplement the data in the well-known book of de Launay, "La géologie et les richesses minérales de l'Asie." The maps are on the scale 1:3,000,000, and they give the coastlines and rivers as guides. Blue circles variously marked on the map for iron give the reserves of magnetite, hœmatite, limonite, bog iron ore, iron sand. Red circles, again variously marked, indicate production and export of iron and steel, with discrimination between ore, pig and steel. At the ports are specially marked circles for imports of ore, pig and steel. The circles, over and above their special markings, have numbers which, by their order and also by the size in which they are printed, give a quantitative measure. Here, therefore, we have distributional maps which give at the same time several kinds of data without much confusion. Needless to say, the maps have not the fine feeling of good stipple maps, but they have the advantage of conveying quickly an idea of quantities. The map for copper is on similar lines, but simpler, because there is not the same range of ores. With insets, the maps include S. Saghalien, Formosa and Korea, the two last being given 1:6,000,000, and each map is accompanied by a statistical sheet. This sheet gives the reserve and production, as far as possible, mine by mine. The maps are part of a series of maps of Applied Geology.

Geographic Factors in the Ancient Mediterranean Grain Trade.

Influence of Geographic Conditions upon Ancient Mediterranean Stock Raising. From the Annals of the Association of American Geographers. Vols. XI and XII. E. C. Semple.

Miss Semple has been devoting herself for some years to the study of Mediterranean life, and these interesting articles should be studied by serious teachers.

The difficulties of wheat cultivation, with its delicate relation to autumn and spring showers (" former and latter rains "), are emphasised, and the greater abundance of the more tolerant barley and millet is indicated. The superiority of wheat and the consequent efforts of Athens and Rome to command wheat areas are profitably worked out, and the reading of Miss Semple's article on grain would serve as a useful preliminary to the study of the great new book of Rostovtzeff. The fertile plains of the lower Tiber and Anio sufficed for the early Roman state and its neighbours for corn lands and some stock raising, while a good deal of the latter was done in longitudinal valleys of the Apennines, and cattle were transferred from lowlands to hills in summer time to get change of food and probably to escape flies to some extent. Later times saw Sicily used as a great grazing estate, the Po Basin supplying pigs, sheep, etc., and corn arriving in large quantities from Sicily, Sardinia, Numidia, Carthaginian Africa, and the Guadalquivir valley, while later still transalpine Gaul and Britain on the one hand, and Egypt on the other, became great sources of supply. The development of Attica's supply of wheat from the north side of the Black Sea is well treated, but one would like to have more facts about that region in Roman times. It remained outside the empire of those grain seekers who so unified the Mediterranean, and in this connection one cannot but think that while food, and especially grain, supply and Mediterranean unification are two important aspects of Rome's work, another that needs attention is that of defence against barbarian inroads.

Miss Semple has interesting notes on alfalfa, cut repeatedly in the earlier summer and ever growing again from its deep roots, and remaining as green fodder through the winter.

We hope these articles foreshadow a book, and that in the making of that book Miss Semple will find it possible to look back into the conditions of pre-classical times.

RECENT MAPS.

General Map of North America. 29in. x 37in. Paper, 2/6. Also issued with various forms of mounting. Bartholomew.

This is a well executed and carefully printed reference map for office and school use. The area mapped extends from N.W. Iceland to East Siberia and from 85 deg. North Lat. to Bogota. The scale is 1 in 10 millions, and there is a latitude and longitude network. The projection is un-named, but it is one which gives little distortion of area or of shape. The main political units are distinguished by contrasting colours, and state and province boundaries are marked. Relief is not shown except for a few isolated named and numbered peaks. The chief railways and steamship routes are plainly marked, and there are some thousands of names of rivers, lakes and towns, all of which, through excellent workmanship, can be picked out quite easily.

Railway Map of the British Isles. 42in x 33in. Paper, 2/6; Cloth, 5/6; C.R.V., 7/6. Philip.

This map, which shows the new (1923) grouping system, possesses several novel features, and while it will make an especial appeal to the business man, it also deserves a display position in the schoolroom, and pupils should be encouraged to consult it for the solution of many problems in connection with the geography of industry. The four main groups are distinguished from one another by the use of purple, green, blue and red colours, and by an ingenious system of open and solid colours, crossbars, etc., the chief component companies of each group are also indicated. Four inset maps, each on a scale about twice that of the main map, give the details with appropriate colours, for four of the most densely crowded areas, while an inset of the London District on a much larger scale shows London Underground Electric Railways in addition. The railways of Ireland are coloured, so that here, too, the various lines of the several companies can be readily distinguished. Latitude and longitude lines are not marked. In general, the scale is about 18 miles to 1 inch, but as there is a slight variation of scale in various parts of the map the publishers have given three separate scales for Ireland, Scotland, and England respectively—a novelty in this class of map which will be much appreciated. Steamship routes with daily service throughout the year are distinguished from other routes, and the average times of the respective passages are shown. The map is strongly recommended.

General Map of Ireland. 23in x 30in. Paper, 1/6; Cloth, 3/-; C.R.V., 7/6. Bartholomew.

This is a political map for office and for school use on a scale of ten miles to one inch. It shows the Irish Free State and Northern Ireland, and all county boundaries are clearly marked. Railway and steamship routes are given, and roads are shown in two classes, with main roads coloured. Named rivers, canals, lakes, peaks, coastal features and towns fill the map with an enormous amount of detail, but the sheet still remains one of those clean, legible productions for which the Edinburgh Geography Institute is so deservedly noted.

General Map of the World. 42in x 28in. Paper, 5/-; Cloth, 7/6; C.R.V., 10/6. Stanford.

The sheet is on Mercator's projection, and extends from 82 deg. N. Lat. to 65 deg. S. Lat., and has New Zealand repeated. The equatorial scale is approximately 600 nautical miles to one inch, and a compound scale for each parallel (at 15 deg. interval) is given. The map is politically coloured with an indication of the Mandated Territories. Lines of communication are shown in red, with mileages between the chief ports and along certain transcontinental railway lines. The sheet has evidently been carefully compiled, and gives very much more information with regard to the smaller islands than is usual on a map of this scale.

Wireless Map of Great Britain. 35in. x 46in. Paper, 2/6; Cloth, 5/6; C.R.V., 7/6. Philip.

This is a very attractive production, which will interest not only "listeners-in," but also all those interested in new cartographical publications. The map is a guide to the various types of wireless stations in Great Britain. Really satisfactory symbols show the distribution of commercial, admiralty, broadcasting, aviation, direction-finding, amateur and experimental stations. The wave lengths of the six broadcasting stations in Britain are given, and around each station concentric circles are drawn at intervals of 10 miles. Each type of station has the call sign plainly stated, and a conveniently arranged index allows of an easy location of any British call sign that may be received. Five directional diagrams have been prepared, showing bearing, distance, call sign and wave length of five foreign broadcasting stations, viz., Newark, Stavanger, the Hague, Nauen, and Eifel Tower. The various details can be transferred from the directional diagrams to their appropriate places on the map, but probably if these diagrams had been printed on a separate sheet of tracing paper and so issued with the map, they would have proved of still greater service. The scale of the main map is 12 miles to the inch, but a very generous inset of the London district is printed on a scale of 1½ miles to one inch. The map has a very large number of hamlet, village and town place names, and these are printed in a soft but nevertheless clear grey on excellent paper, so that there should be no difficulty in marking such new stations as may be established from time to time. The whole map has been prepared under expert supervision from information supplied by the "Wireless Press, Limited," and the publishers are to be warmly congratulated on their share of the work.

Comparative Wall Atlas of South Africa. 8 maps, mounted, dissected, eyeletted, in case, 47/6 net. Single maps, 7/6. Edited by J. F. Unstead and E. G. R. Taylor. Philip.

This is the tenth set of wall atlas maps to be issued by these publishers, and represents the third of the sets covering less than a complete continent, viz.:—(1) British Isles, (2) United States, (3) South Africa. An "India" set is being prepared. The maps extend from Cape Agulhas to 16 deg. S. parallel, and in each case have a special inset of the Agulhas Bank. The larger scale possible has been well utilised, and as the Africa set has been previously reviewed in these columns it may be an advantage to compare the two sets. Each map is 43 inches by 33 inches, the scales being approximately 150 miles and 42 miles to one inch respectively. Map 1 (Relief and Communications) has much more material, with a welcome revision of detail, including a more satisfactory spelling of place-names, e.g., Kebrabassa, Motopo, Karreebergen, Karas Mountains, Walvis Bay. Possession Island, which is marked and named on the smaller scale, is named but not marked on the S. Africa set, though the smaller Pomona Island is both named and marked. The layer tints though bright are harmonious, and the contour lines appear to have been carefully drawn. There is an extra red tint for the land above 9,000 feet, and it is unfortunate that the amount shown is of necessity so small that there is confusion between the tint and other material shown in red. This is particularly noticeable in Map 5 (Temperature) when the map is exhibited at the average class-room distance. Political boundaries are also shown in red, but are not identified in the map tablet. Map 1 does not indicate navigable river-sections as is done on the Africa set. Map 2 (Political Divisions) has the place names in black instead of being in the attractive grey tint used in other cases. There seems to be no special reason for the change, and as the type employed is both heavy and not particularly pleasing in many cases, the map gives an unfortunate impression of excessive overcrowding. Colours are not fully identified; red is overprinted on black for sailing routes, and the whole map is much less attractive than No. 8 (Political) in the Africa set. Maps 3 and 4 (Rainfall, Winds and Pressure) are very satisfactory, and a considerable amount of revised detail is included, e.g., eight tints are used for rainfall instead of the previous six, and the May-October map gains much in consequence. Isobars are drawn for 1-20th inch pressure interval and are also numbered in millibars. The ocean currents have been added in the S. Africa set. Map 5 (Temperature) has several revisions included, e.g., a 96 deg. January closed isotherm is suggested for the Kalahari Desert, and the 80 deg. isotherm is marked much further north along the east coast. The 64 deg. July isotherm has a rather striking loop introduced, but the editors in their handbook accompanying the maps warn their readers that such maps are valuable only for broad conclusions. A new and excellent feature is the addition of "actual temperatures" at a large number of selected stations, but some of them indicate the difficulty of determining the altitude factor requisite for reducing isotherms to sea-level, and thoughtful pupils are likely to ask awkward questions regarding Pretoria and Johannesburg. Map 6 (Vegetation and Botanical Regions) has been compiled by Mr. George Philip from the work of Dr. Pole Evans. It successfully attempts to show very much more than the earlier map, and will make a special appeal to teachers correlating botany and geography. The symbols and tints are well chosen. Map 7 (Density of Population) shows distributions, as before, by means of eight tints, but uses the 1921 Census figures. The larger scale allows of very much more grading of certain areas, e.g., Johannesburg, Maseru, Kimberley, while several additional interesting facts regarding the scanty population of sections of the Great Karroo are shown. Map 8 (Economic) is another useful experiment in the mapping of industrial data. It is probably more valuable than the previous Africa map. Its four tints are largely based on vegetation facts. Agricultural products are shown by initial letters as previously. Mineral products are indicated by symbols more or less geometrical in form, and as there are 20 of these it is obvious that it has been necessary to use purely conventional signs which carry no part of their meaning in their shape, in fact the shapes allocated to some of the minerals differ on the two maps. A new feature of some value is an indication of the character of the deposits, distinguishing "worked" from "unworked." From this short summary it will be seen that the S. Africa wall atlas contains a large amount of new and excellent material, and teachers dealing with this special region will find the atlas of the greatest possible value.

WALLACE E. WHITEHOUSE.

SOME SCHOOL TEXT BOOKS.

Ocean Highways. H. W. Howes. Wheaton. 2/-.

This original little book is certain of a welcome in schools. It has been written by one who has undertaken many ocean voyages and who is conversant with school children and the things that interest them. It contains numerous illustrations and sketch maps, and would form a useful introduction to the main facts of the world's trade. Questions are appended to each chapter, and are the more valuable as they insist on the use of the atlas. It is unfortunate that the author has not put either scale or any indication of latitude and longitude on the sketch maps.

Junior Regional Geographies. Book II. The British Isles. W. H. Barker and L. Brooks. Univ. of London Press. 2/-.

This up-to-date little text book will be of great use in the upper classes in elementary schools and in the lower forms in secondary schools. It is regional in its treatment, and contains excellent suggestions for practical work at each stage. The illustrations are attractive and original, notably that of Salisbury Plain from the air, which contrasts vividly with a photo of Cardiff from the air. We are glad to note the map of an English market town. Teachers who are ordering new books for next year should certainly see a specimen copy.

A First Geography of South Africa. A. Moir Robb. Blackie. 2/6.

This book has been prepared to meet the needs of children in Standards III and IV in S. African schools by a S. African Inspector of Schools. It is an interesting parallel to the Canadian geography reviewed elsewhere, but unlike that book, it deals with the geography of South Africa alone and not with general world geography. Each book, however, marks the rapid advance that the study of geography is making in the Colonies. It would be well for teachers in our own secondary schools, when forms are studying South Africa, to get the book put on the school shelves, for undoubtedly geography written on the spot has a vividness and interest not otherwise attainable. The sketch of the Limpopo should appeal to child lovers of Kipling, and the photo of the penguins on Halifax Island will certainly amuse and interest. The note on "White, yellow and black" touches on a great truth, that cannot be too often emphasised if international goodwill is ever to come about, when it says, "All the races help by doing work of some kind."

The Americas. James Bruce. Bell. 3/-.

The publishers explain that this "Explorer" series is meant to interest older children in the story of geographical discovery. We cannot help feeling that older children are more likely to be interested by being given free access to the records of the great explorers themselves, and we are glad to see that a list of such works is given at the end of the book, and even though the list is, as the author frankly confesses, by no means exhaustive, yet it includes such great books as Darwin's "Voyage of Beagle," Bates' "A Naturalist on the Amazons," and Prescott's histories. It does not, unfortunately, give any of the great series of geographic studies undertaken by modern Americans, e.g., "The Andes of Southern Peru," Bowman. The book itself is an introduction to the geography of the Americas, and contains several chapters on their historical geography and a separate chapter on each of the great natural regions. There are eight double page panorama views.

Great Britain and Ireland. A. Wilmore. Bell. 4/-.

This book is intended by the author for scholars of the middle and upper forms of secondary schools. It is based on the author's conception of geography as set out in his well-known "Groundwork of Modern Geography." There is an appendix on Rocks and Rock Systems, and another containing questions and exercises and an index. The book will certainly form a good general reference book for those schools working on the individual study system. An interesting commentary on the doubtful value of "name facts" in geography as against the value of physical facts is that the section on Railways has been rendered very much out-of-date. A section giving, with maps, the way in which railways meet physical difficulties in the British Isles, would hardly have been so quickly put out of use. It is unfortunate that many of the sketch maps are without indication of scale.

Human Geographies for Secondary Schools. Book III, Euro-Asia. By J. Fairgrieve and E. Young. 7½in. x 5in. pp. 334. 3/6. Philip.

The books of this series are intended by their authors to be progressive in difficulty and human in outlook. Both claims are well supported by the present volume, which has to handle matters presenting difficulty both to the average teacher and the average pupil. The region is a very wide one, and there are four chapters on Asia and the East Indies, two on Australia and New Zealand, and eleven dealing with the mainland of Europe. As in the case of Books I and II, illustrations are frequently employed (160 in Book III), and many of them have been specially drawn for this volume. School text books would gain enormously by the more frequent use of such diagrams as Fig. 21, etc., demonstrating that maps on more than one scale are necessary even for the introductory study of town sites. There is much evidence that recent serious books have been consulted previous to its compilation, and the statistics have been carefully chosen, and many of them have to be used in the numerous excellent exercises at the end of each chapter. There is much in the book which deserves special comment, but two items at best will favourably impress the modern teacher, viz., the careful balance maintained between information and reasoning, and also the large amount of serious material which is so written as to present little difficulty. Any pupil with a clear understanding and knowledge of such text books as this would be welcomed by teachers responsible for the higher grades of the subject. W.E.W.

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AUTUMN 1923.

EDITORIAL.

BY the sudden death of Mr. Carle Salter on May 21st, the country lost one who is irreplaceable. As the successor to Dr. H. R. Mill, at the head of the British Rainfall Organisation, he held in his own hands all the threads of that unique scientific body. He joined the staff of the Organisation in 1897, and first under G. J. Symonds and then under Dr. Mill he came to know all that is known of the theory and practice of rainfall recording, and to acquire an uncanny accuracy in drawing rainfall maps often on scanty data. He was always called as an expert in any water supply legislation, and in his own department his word was accepted as giving the facts as far as they were known. In all this work he has no successor with sufficient knowledge and experience. In his later years, in addition to writing his volume on rainfall of the British Isles, he contributed a number of papers to professional journals advancing knowledge of rainfall work, and he completed Dr. Mills' work in preparing a set of monthly rainfall maps of the British Isles constructed with the latest knowledge and by the most accurate cartographic methods, methods which he himself did much to work out. Trained under Dr. Mill, Salter naturally had the geographic outlook on his subject and geographers especially feel that they have lost a tower of strength.

IT is with great pleasure that we announce the acceptance of the Presidency of the Association for 1924 by Professor Sir R. A. Gregory, an old and valued helper of the Association, and, many years ago, a member of its Council. His Presidential Address will deal with "British Climate in Historic Times." The Annual Meetings will be held on Thursday, January 3th, 1924, and following day or days at the Birkbeck College, Bream's Buildings, Fetter Lane, London, E.C.4. The details of programme will be given on a leaflet which we regret will not be ready early enough for insertion in the Magazine, and which should be kept till the meetings as evidence of membership.

ARRANGEMENTS have now been completed for the publication by Messrs Ernest Benn, Limited, of a new Series of Historico-geographic monographs, of which a special edition will be issued for members of the Geographical Association. It is expected that the volumes, which will be as far as possible uniform in style, will be bound in boards, and published at prices ranging between 3s. 6d. and 6s. according to the length of the individual monographs. A cloth-bound edition, not limited to members of the Geographical Association will also be available at slightly higher prices, ranging between 5s. and 8s. 6d. The first two volumes of the new series to appear will be "The Dravidian Element in Indian Culture," by Gilbert Slater, D.Sc., and "The Hampshire Gate," by H. G. Dent. The Series is under the editorship of Professor H. J. Fleure.

IT is a matter for congratulation that the Permanent Committee on Geographical Names has been able to continue its work and to issue two more lists (Asiatic names, 2nd. list, and Gold Coast and Togo) making the 9th and 10th publications of their series which may be obtained from the Royal Geographical Society, Kensington Gore, London, S.W.7, price 6d. each. Amboina (not Amboyna), Anwhei (not Nganhwei), Belitong (not Billiton), Chihli (not Chili, Pechili), Hadramout (not Hadramaut), Helmand (not Helmund), Kun Lun (not Kwen Lun, Kuenluen), represent a few of the many adjustments of common names which are proposed. It is greatly to be hoped that these lists may spread wherever geography is studied so that standard forms may acquire general usage.

UNDER the auspices of the British Association a Joint Committee of the Geographical and Educational Sections with Principal Nunn as Chairman and Mr W. H. Barker as Secretary, has been engaged in drawing up a memorandum on Geography Teaching which we should like to see widely circulated for discussion and application of its ideas. In the introduction every experienced reader will see evidences of the mind of Sir Halford Mackinder, while the general sequence of the report clearly owes a great deal to the officers of the Committee already mentioned. The Committee was a representative one and its work should help greatly to clarify the situation in connection with school geography, now that new opportunities have been opened up by the ending of the long standing difficulty about geography in advanced courses. There is now need for a strong effort to make some examinational authorities accommodate themselves to the new situation by giving geography its place as a full subject at the Higher Certificate Stage. Particulars about the publication may be obtained from O. J. R. Howarth, Esq., M.A., British Association, Burlington House, London, W.1., by sending stamped addressed post card for reply.

THE rapid development of our Library, and the fact that 450 members of the Association use the Library, the effort to inaugurate a lending Collection of Lantern Slides for Library Members, have all meant heavy work and expense during the year. The finances of the Association are thus temporarily weakened and we venture to appeal for gifts to tide us over this critical time. For gifts already received the Association as a whole will feel most grateful and especially to the loyal member whose large anonymous gift made an effective start with the lantern slide scheme possible. So many books have been added since our last list appeared that there is not space for the long list in this number. It will be sent to borrowers who send a stamped addressed envelope.

THe Editor acknowledges with many thanks the following gifts:—Bristol Branch, £3; York (anonymous member), £1; Westminster Branch, £1 12s; Miss A. S. Grindlay, 5s; Mr E. E. Lupton, £2; Miss F. A. Thomas, 10s; Miss A. Brindley, 5s; Misses McLean and Adam, 10s; Mrs Burgess, 2s 6d; Swansea Branch, £1; Brighton Branch, £1 1s; Miss G. H. Coster, 5s; Miss Beaumont, 10s; Miss M. V. Couser, 5s; Anonymous Member, £21; Aberystwyth Summer School Students, £5 17s 6d; Bishop Auckland, £2 10s; Mr E. Young, £1 1s; Mr Tunstall, £1 1s; Mr Saxelby, 5s; Mr Ll. Rodwell-Jones, £1 1s.

THE Editor acknowledges with many thanks the gift of several books to the Library by Miss J. B. Reynolds, Littlecote, Jarvis Brook, Sussex, and of negatives from Professor P. M. Roxby and Mr W. H. Barker; 20 slides from Miss E. H. Burton; negatives from Miss Walton, and help towards the slides from them from Miss Lee and Mr Woodhouse; 60 slides of Switzerland from Mr A. E. Minns; 100 slides of Norway from Mr. Fairgrieve.

THE Lantern Slide Collection will be available from January 15th, 1924, to all members who are subscribers to the Association's Library. In order to help members in choosing and using slides we hope to issue, gradually, a catalogue in the form of a series of sheets giving notes of the main points of interest on each slide. A sample sheet, for which special thanks are due to Mr W. H. Barker, who has given the negatives concerned to the Association, is now ready for distribution, price threepence, post free. Particulars will be available from the Central Office of the Association after December 15th.

THE Committee of the Exeter Branch of the Association has kindly invited the Association to hold its Spring Meetings in that historic city. The dates proposed are April 10th, 11th, 12th, and the programme suggested is a very interesting one. The thanks of the Association are specially due to the Exeter Committee and to Mr W. Stanley Lewis in particular. Members sending a stamped addressed foolscap envelope to the Clerk in February, 1924, may have full details posted to them.

THE GEOGRAPHICAL TEACHER from this number onwards will contain a special page written for the elementary school and its problem, and this section for the time being will be under the charge of Mr Ernest Young, so well known for his educational work and for his publications.

Books on Scientific Subjects.—MM. Armand Colin (103, Boulevard, S. Michel, Paris), who in pre-war years issued many of the fine monographs of French regions which were prepared by M. Vidal de la Blache and the men whom he inspired, are now adding to their publications a series of small books on scientific subjects. We have had the opportunity to see "Les Pyrénées," by M. Sorre (1922), who wrote the large book on "Les Pyrénées Orientals." These new books are pocket size and well provided with maps including some folders, and they have bibliographical references to lead the student on. The discussion of glaciation in the Pyrenees, past and present, is specially interesting in this little volume, while the name of Sorre assures us that there is much that is of interest in the humanist chapters. The maps in the "Times" Atlas or the French 1/½M, or the international 1/M will be found valuable for study of this book. The books are priced 6 francs each, and thus offer teachers good opportunities to help those pupils who think of proceeding to the universities to acquire before going there facility of reference to books in a foreign language. Such facility may make all the difference in a student's university career, and it is greatly to be hoped that all university honours schools will be firm in requiring it from their students. Forthcoming books in the series are to deal with the great markets for raw materials, French iron industry, plants for fibres and so on. One on the plants giving vegetable oils has already appeared.

THE ISLAND AND THE EMPIRE.

An address by Sir Charles P. Lucas, K.C.B., K.C.M.G., Vice-President of the Geographical Association, to the Imperial Education Conference, 1923.

THIS meeting, at which I am greatly honoured at being asked to speak, is due to the welcome presence in London of representatives of the Education Departments overseas. I suspect that boys and girls in the schools and colleges of the Dominions, Africa and India could answer more questions about Great Britain than boys and girls in Great Britain could about other parts of the Empire. This, up to a point, would be expected, for Great Britain has the most history and, if India be excepted, the longest historic past. But, in Rudyard Kipling's words—

"What should they know of England who only England know."

If we in Britain wish to know the true history of our island, we must keep the Empire always in sight and always in mind. Moreover, if we want our oversea brethren to maintain their interest in us, we must widen and develop our interest in them. I begin, therefore, with an earnest appeal to the home Education Authorities to foster to the utmost the study of the Empire.

Further, to all the Education Authorities present, I venture strongly to commend the work which the Visual Instruction Committee of the Royal Colonial Institute, in co-operation with the Victoria League, have in hand the compilation of admirable lecture notes by expert hands, with carefully selected slides, on all parts of the Empire, including Great Britain. Specimens are on show among the Board of Education Exhibits, and I hope the work will be sampled by our visitors before they leave.

Now I am asked to speak on the teaching of the History and Geography of the Empire. Richard Hakluyt called Geography and Chronology *"the sun and the moon, the right eye and the left of all history."* All will agree that history cannot be properly taught without the aid of the map, and if history should always be coupled with geography, especially is this true of the history of the British Empire which, as I shall try to show, is geography's own child.

There are three points to which I should like to make passing reference.

(1) The first is, that the value of maps for purposes of teaching and learning seems to me to be, within reason, in inverse proportion to the number of names upon them. On a crowded map the forest cannot be seen for the trees, and the result *tends to be wooden and congested brains.*

(2) In the second place, good maps showing seas compassed by lands instead of lands surrounded by seas are of prime importance for the teaching of history. For instance, the past history of Africa, prior to the days of Livingstone, was not the history of a continent but of a series of coastlines. To explain and illustrate its past what are required are maps of the Mediterranean, the Atlantic and the Indian oceans, showing the north, west, and east sides of Africa as what they actually were in history, the south, east, and west shores of the Mediterranean, the Atlantic and the Indian ocean respectively.

The Pacific ocean is credited with having largely in its keeping the future of the world. In order to appreciate its importance we need maps of the Pacific basin as one whole, with the land boundaries, however distant, brought out in strong relief.

(3) My third point is the importance of teaching from Place Names. I need not give illustrations. I sometimes think if teachers were compelled to teach the Story of the Empire from Place Names alone, it would be better

learnt, and certainly better remembered, than by teaching from any other source. An English Place Name Society has been formed with headquarters at the University of Liverpool. Its scientific researches will no doubt throw great light on the origin of familiar place names transplanted beyond the sea. But for teaching I have long thought that we want an Empire Cyclopædia of principal place names on comparatively elementary lines, and if the present conference was to give birth to a co-operative work of the kind, to my mind it would be a very great aid to the teaching of the history and the geography of the Empire on a basis common to us all.

Now, I assume that the history and geography of each unit of the Empire has been thoroughly taught and learnt in the schools and colleges of the different units. I have every reason for this assumption from knowing what is being done on the top floor of historical work which, no doubt, filters down into the basement. No praise could be too high for the indefatigable research and the scrupulous accuracy which characterise the historians in and of the Dominions. Through their work the coming generation will know all that humanly can be known of all the men and all the incidents in the making of the young nations. If I may venture to criticise, my criticism is that the histories are sometimes too minute and too introspective. There is a tendency to repeat our own home-fault, the fault of recording the history of the unit with too much aloofness and with too little regard to the setting of the part in the whole.

HOW SHOULD THE STORY OF THE WHOLE BE TOLD?

It goes without saying that the truth must be told, the whole truth and nothing but the truth—

Nothing extenuate nor set down aught in malice.

The horrors of the slave trade, the iniquities of the early years of the East India Company's mastery of Bengal, the unwisdom which lost us the United States of America, various crimes and blunders have long since been condemned at the bar of history. They are matters not of controversy but of fact. They should not be omitted, much less whitewashed. They should be noted for admonition. Do not let the children think that we never made mistakes, lest they come to the logical but disastrous conclusion that they have inherited infallibility.

Apart, too, from actual warts and blemishes on our history, for the sake of truth as well as in accordance with British love of fairplay, teachers should be at pains to do full justice to our rivals in the race for empire. Very many of the citizens of the Empire are of Dutch or French descent. When Great Britain succeeded at the expense of the Netherlands or of France, account for it, if you think well,—it nearly always comes back to the bedrock fact that Great Britain is an island—but let your hearers appreciate the greatness of these competing nations, bring out their strong points in preference to their weaknesses, explain why they achieved so much rather than why they did not achieve more. The generous view is nearly always the nearest to the truth.

Blatant jingoism is abhorrent to right-minded men of all races and all times, but to me more abhorrent still is the opposite vice of fouling one's own nest and belittling one's own people. That we have good reason on the balance of the account to hold our heads high and take pride in our fathers that begat us is the truth.

Because it is the truth there is no reason for concealing it.

The British Empire is not a colossal expansion of original sin, as some seem to think. It is a great and glorious achievement. It has set up a standard for empires and provided a text on recognition of responsibility. I do not hold with those who for the term *British Empire* would substitute *British Realm* or *British Commonwealth*. We should not be the slaves of this or of any other word. *Instead of letting Empire give us a bad name we should go on giving it a reformed character. British Empire* speaks to vast numbers in terms of affection, and by retaining the phrase we shall be true to our national type of which I want to say something to-night, a leading feature of which is not to discard what is in existence but to adapt it to new conditions. *"A great empire and little minds go ill together"* said Burke. See to it that the young do not grow up little-minded. Keep them in mind of Macaulay's fine words: *"A people which takes no pride in the noble achievements of remote ancestors will never achieve anything worthy to be remembered with pride by remote descendants."*.

Charges of bragging and jingoism are too lightly made. Take these very familiar lines:—

This royal throne of Kings, this sceptred isle,
This earth of majesty, This seat of Mars,
This other Eden, demi-paradise,
This fortress built by Nature for herself
Against infection and the hand of war,
This happy breed of men, this little world,
This precious stone set in the silver sea,
Which serves it in the office of a wall,
Or as a moat defensive to a house,
Against the envy of less happier lands—
This blessed plot, this earth, this realm, this England."

or take these few lines of prose—

"Lords and Commons of England, consider what nation it is whereof ye are and whereof ye are the governors, a nation not slow and dull but of a quick, ingenious and piercing spirit, acute to invent, subtile and sinewy to discourse, not beneath the reach of any point the highest that human capacity can soar to."

Suppose these two passages had been written and published in the 20th century by two men who happened to be named William Shakespeare and John Milton, would they not have been held up to ridicule and reprobation in some quarters as beating the big drum, as the quintessence of bragging?

Milton, writing on education, says that *"such lectures and explanations"* should be given *"upon every opportunity"* that all young men may be *"stirred up with high hopes of living to be brave men and worthy patriots, dear to God and famous to all ages."*

The story of the Empire can and should be made an inspiration to patriotism to service to the particular unit of the Empire, the inner circle widening into service to the outer circle, the whole Empire or Commonwealth, in which we are all partners and which we can make or mar.

Now, keeping the truth always before our eyes, what is the main thread running through the history of the Empire and which should therefore run through the teaching of that history? It is this: The Empire in its essence is the product of natural not of artificial causes, the outcome of growth rather than of force. Of this there are two immediate and unanswerable proofs—(a) In the first place if it had been a creation of force, it could not have held together in the late war; it would have been a human impossibility. There must have been free will in it. There must have been some element of natural cohesion. Nothing else will account for the fact. (b) In the second place, if it had been a creation of force the Empire would not have been the human jigsaw that it is, a conglomerate of endless diversities. Uniform is the mark of a soldier. Uniformity, more or less, has been the mark of an Empire in the old popular sense, the sense of military domination. Uniformity is conspicuous for its absence from the

British Empire. The British Empire is the result of growth. In saying this I am not so foolish as to maintain in the teeth of history that force has not entered into the making and keeping of the British Empire, but I do maintain, most confidently, that force has hardly ever entered into that history in the form in which it has usually figured in other Empires, that of premeditated conquest. It has come, as in India, in the train of growth; and it has brought with it, as in India, the seeds of more growth.

Where did the growth originate and why?

Concentrate with me now for a few minutes on the source of the Empire, known by a name which hardly suggests force, *The Old Country*.

It is an island, and I often wonder why reference is so seldom made to the fact that with the exception of Japan, which is on the threshold of Empire building, Great Britain is the only island in all history which has made and kept an Empire. Tyre was an island city and a queen of trade, but there was no Tyrian Empire. Venice can hardly be classed as an island or the Venetian dependencies in the Middle Ages as an Empire. Alone among islands Great Britain has been an Empire builder. What wonder is it that its work has been of a different pattern from that of all other Empires.

It is a large island, nearly nine times the size of Sicily, which was the outstanding island of the Mediterranean world. It is large enough not to have been since Roman times a political dependency of other lands, as Sicily became. It is large enough to be on its own in in all respects but one and that one exception is a latter-day exception and of its people's own making.

Within it is almost every kind of landscape, soil and non-tropical product. The highlands of Scotland the Lake Country and Wales contrast with the plains of the Midlands and East Anglia. There are the rolling downs of the South, there is reclaimed fen and forest, grasslands, cornlands, mineral areas. It is in a singular degree what Shakespeare calls it in the words which I have quoted a 'little world.' It is a land without extremes, with a day to day working climate throughout the year, fitted to rear evenly-balanced citizens. It is the most accessible of islands, richly harboured on all sides, fashioned for coming in and going out.

The one respect in which the island is not on its own is that it does not provide enough food from the soil for the children of the soil. In the past it did produce enough, but its sons set themselves to expansion, expansion of numbers, preferential expansion of the resources which give the richest return. They shaped a future of profit from peace not from war, they put their faith in the natural facilities of the island for trade and intercourse, they relied on freedom in trade as in all other things. The result has been that the island has been outgrown, and as it has become more and more dependent upon food supplies from beyond the seas, at the same time and in much the same ratio what we call the Empire has grown. It has all been a monumental instance of growth.

Into this island in historic times came many varieties of the human kind, Romans, Saxons or English, Danes, Normans, followed by a constant trickle of Germans, Flemings and Frenchmen. In the north and west the earlier Celtic immigrants held out, and to add to the confusion, the Celts included Scots who were really Irish immigrants, and being Irish got themselves called by the wrong name. Northern and sea-going stocks predominated, and among them the forefathers of the English gave South Britain its name.

These English were not one to start with but three kindred tribes. They did not come over in one wave of invasion, but in spasmodic fashion. When they had come over they formed separate settlements and for centuries were more concerned with dividing than combining their forces, setting up petty principalities to fight one another. There was no uniformity whatever about the English or their proceedings.

Now, apart from the natural advantages to which I have referred. What did the island do for this medley of human beings from the mere fact of being an island?

It had two main effects, neither of which is, perhaps, self-evident at first sight.

In the first place by being an island, i.e., by not being geographically continuous with other lands, it gave to the islanders greater continuity of history than has been vouchsafed to most peoples.

Geographical continuity does not bring in its train continuity of history. The history of continental peoples is ever liable to be rushed or retarded, fore-shortened or side-tracked by interference from or interfering with their neighbours. For historical continuity, in other words, for the natural growth and uninterrupted development of peoples on their own lines and in their own ways we must look in preference to islands or to all but islands, peninsulas.

In the ancient world it was in the peninsulas of the Mediterranean with the sea on three sides and mountain barriers on the fourth that history went forward. Severance from the continent gave to Great Britain a priceless opportunity of running its own course in its own way, and when, but not until, it lost all political connection with the neighbouring continent it ran its own course in the fullest possible measure.

A sense of continuity has ever been imbedded in our race and runs through our literature. *"It has been the uniform policy of our constitution,"* wrote Burke, at the time of the French Revolution, *"to claim and assert our liberties as an entailed inheritance, derived to us from our forefathers and to be transmitted to our posterity."* Carlyle, in "Past and Present," speaks of what he terms the *"invincible instinct"* of the English *"to hold fast by the old . . . . . to expand if it be possible some old habit or method already found fruitful into new growth for the new need."* Tennyson, in well-known lines, describes England as a land

"Where freedom slowly broadens down
From precedent to precedent."

The poets of our island have drawn more inspiration from their country's past than has been the case in most other countries. Note the number of Shakespeare's historical plays which treat of English history. In his day Great Britain was in no way the chosen home of romance. Yet of his four great tragedies, England is the scene of *King Lear* and Scotland of *Macbeth.* In England again he finds the stage for *Cymbeline* and the *Merry Wives of Windsor.*

This sense of continuity, like the continuity itself, is the gift of the island. By giving at once the fact and the consciousness of natural growth, it has safeguarded its people from the wanton and wasteful spirit which seeks to scrap the past.

(B) My second point is that in running its own course the island has given full play to all its constituent elements and preserved to an extraordinary degree its diversities. At first sight it might be expected that there would be more speedy and more complete fusion of races and stocks in islands than in continental countries. On continents in old days, when in the Old World there was more elbow room than now, when peoples were fluid and nations not yet made, if one tribe or people was ill content with its neighbours, presumably it had the remedy of moving on and off. But for those who had made their way into an island and burnt their boats it was not so easy to move out again, and the inference would be that human beings in a ring fence after a decent interval of fighting would settle down comparatively soon, join hands and make the best of it.

But the teaching of history seems to be otherwise. Greeks and Carthaginians never fused in Sicily.

Take the case of an all but island. Except for an interval of sixty years when force prevailed, Spain and Portugal have never come together.

The explanation probably is that the comparative security of an island or peninsula makes unity for purpose of defence not so imperative as in the case of countries with open frontiers. To take a very modern illustration, confederation was more obviously needed by Canada with an open southern boundary than by the island continent of Australia.

At any rate Great Britain is a most notable instance of absence of fusion. Think of the interminable number of centuries spent in making approaches to unity and never reaching it. Except for dubious and transient claims to overlordship we had to wait till 1603 for a single king. A single king did not make a single kingdom. For that we had to wait another 100 years, till 1707. To this day England and Scotland are not wholly fused. The mere suggestion would give a Scotsman pain. The races of the island are not fused. The Gaelic Highlanders and the north Welshmen are quite distinct from the Englishmen and from each other and speak their own tongues.

Take the Englishman only. A Lancashire man is more distinct from a Devonian or a man of Kent than, say, an average New Zealander from the most distant great province of the Empire is from the average old country Briton in the home counties. Nor is the present tendency towards greater fusion, it is rather in the opposite direction, as witness the catchword 'self-determination.'

We build our hopes for the future on a League of Nations. It has often been pointed out that a model of a League of Nations, actively and beneficially at work, is to be found in the British Empire. But what is the source and the ultimate model of this working League of Nations? It is the island in which English, Scotch and Welsh have never fully amalgamated.

What the island then has done for its sons has been on the one hand to ensure to them continuity of history, on the other hand maintenance of diversities. The continuation of continuity and diversity spells natural growth.

The more a living thing, plant or animal, grows, the more it differs from its first beginning, but by a process of continuity.

Though of necessity the Empire of an island cannot be geographically continuous, if there are lands hard by there is no geographical necessity for the Empire to be at a far distance. In the Middle Ages the Kings of England, as we all know, tried their hands at continental dominion across the Narrow Sea and conspicuously failed, and it was only after the failure was complete that a British Empire began which was not a failure. Why was this?

Because an Empire on the adjoining continent of Europe, where the land had already been taken up and white nations were becoming more and more organised, could only be an Empire of force maintained by a succession of Crecys and Agincourts. This was not what the island either could do or would do. It was beyond its power and contrary to the instinct which it had given to the islanders. They were not in search of nations to conquer but of footholds for seagoing trade and regions wherein to grow. They followed the lines of least resistance and distance ruled the Empire.

Distance brought difficulties, no doubt, but infinitely greater advantages. It promoted, it necessitated diversity, but equally when combined with sea power it provided continuity, freedom from interruption. It made for natural growth. Once the continuity was rudely interrupted by the war of American Independence. Why was it? Because the powers that were in Britain at the time, forgetting what kind of stock the island had produced and what kind of Empire that stock had produced, deviated from the lines of natural growth which the island had dictated, and made a disastrous venture in the direction of systematic Empire on the lines of continental nations and based on force.

Otherwise our greatest failure has been not at a distance but at our own doors. The past history of Ireland has been a record of failure simply because there was perpetual conflict between treating the neighbouring island as an integral part of the Old Country and treating it on the lines of diversity followed beyond the sea.

All the world over the hall mark of the island, the absence of fusion coupled with the strain of continuity, has been impressed, on the different parts of the Empire as on the whole. Everywhere are diversities. French and British have not fused in Canada. Lord Durham recommended fusion: it was never carried out: it was not even attempted. Race, language, creed have run side by side, quite distinct, never fused. Self-governing institutions of purely British origin have only endorsed the absence of fusion. It has been the same in South Africa. Yet in either case there has been continuity of broadening out, both territorially and in the matter of institutions. A number of small units have been combined into single large units, dependencies have become self-governing colonies, dominions, autonomous nations. The railways of the Empire, without which the large units could not have been formed, which have made a single Nigeria, for instance, as well as a single Canada, are an outward expression of continuity.

There has been no fusion in India, none whatever, of race, creed, class or tongue. British India moving towards self-government on British lines is side by side with Indian principalities, the status of whose rulers is more fully recognised than ever. Yet there is a markedly and continuously growing sense of unity in India, and it is the result of the island's influence and control.

In Africa and the East there is a noteworthy tendency to favour what we know as the Protectorate method, the method of indirect control, whereby native institutions and native machinery of administration are employed, adapted and improved in lieu of being supplanted by alien British institutions. It illustrates at once British indifference to uniformity and British sense of continuity, taking what is in existence and developing instead of scrapping it.

Take once more the Far East, where the Home Government has parted with none of its powers. Hong Kong and Singapore are two of the freest ports in the world. Malaya can hardly be matched as a scene of unrestricted coming, going, settling of diverse races, an illustration of almost unprecedented growth due to the supreme British merit, homegrown in the island, of not worrying people into conformity.

The island's work has reacted on the island itself. Except in the literal sense of tacking on thousands or millions of square miles to the shores of Britain, the island's borders have been infinitely enlarged. It has become a different kind of island. Without the Empire it would be a shrunken island with a different life altogether, or to put it in an another way, instead of being within its four seas an independent island, it is now a province of an Empire, the oldest and most honoured province, the senior partner, but still dependent upon the other provinces, requiring to be supplemented by the other provinces, if it is to continue to run its course on the lines of natural growth.

In this rare combination of diversity and continuity, I find the key to the riddle of the Empire. *The old order changeth.* A limit has apparently been set alike to territorial expansion and to predominance of sea power. Distance is fading away. The powers of the air take no count of the inviolate sea which compasses the island. Yet the breed has been but yesterday supremely tried and found the same as ever. A world-wide commonwealth enriched by many elements has grown up on the island's lines. Why should we doubt that in the future as in the past the "invincible instinct" will prevail and that we shall expand old habits or methods already found fruitful into new growth for the new need.

I have left to the end a question which should properly have been asked and answered at the very beginning. Of what does the British Empire consist at the present day, and what are its boundaries? It is a most elementary question, with which teachers no doubt begin their lessons on the Empire. I did not put the question for this reason. Neither I nor any other human being can give the answer.

Regional Survey.—We would draw the attention of teachers and students, especially those in S. and S.E. England, to the importance of the volume for 1921-23 of the Transactions of the Croydon Natural History and Scientific Society. The President is the well-known 'regional survey' worker, Mr. C. C. Fagg, and he contributes a most suggestive address on the dry valleys in the chalk. He reviews current theories of glacial action and action of subterranean streams, and refers to ideas of changes of land levels and so on. But to none of these factors does he attach so much importance as to the notion of progressive denudation of the Gault. Springs flow out where the base of the chalk outcrop shows the Gault below it. As the Gault is worn away the level of saturation in the chalk is thus lowered, and valleys in it, which previously might have been subject to outflows, thus become dry at all events at the top. Thus progressive denudation in the chalk area affecting the softer rocks would be left dry at the head. If we also remember that saturation levels were formerly higher, and the climate has been wetter in some periods (postglacially), we obviously have a good deal of help towards an interpretation of the famous dry valleys. Mr. G. T. Mackay contributes an illustrated study of river meandering on the upper Mole. He follows the movements of water at a river bend in some detail, and follows the life history of a meander closely.

The studies of climate and vegetation for the area in 1921-22 are a feature of this valued report of a Society which has a long and distinguished tradition of regional survey. The President's versatility is seen in his second address, which takes for its subject "The Significance of Freudian Psychology for the Evolution Theory."

" Dry Noses."—A curious and unexplained phenomenon in climatology is the existence of fairly extensive peninsular areas much drier than might have been expected; Yucatan, the eastern horn of Brazil, and the eastern horn of Africa are perhaps the outstanding examples, but the north end of Madagascar (see Geographical Teacher, Spring, 1923, p. 65) and other points also show this feature. Attempts have been made to explain the comparative dryness in terms of the divergence of currents of water and air-splitting off the point in each case. These explanations may have an element of truth in them, but they are scarcely conclusive; it is a weak point of some of those explanations that they rather suggest that currents of air as well as those of water are split and deflected by those peninsulas. If one compares the height of the land with its superficial extent this does not appear to be at all likely. The height of Somaliland is only about one-thousandth of its width. It may, however, be suggested that as a great proportion of inter-tropical rain falls during thunderstorms the dryness of such areas as we have mentioned may be due to the comparative absence of conditions which are favourable to the development of thunderstorms. We shall be glad to hear from readers on this subject. J.F.

ROADS AND TRAVEL IN BIBLE TIMES.

NOTES OF AN ADDRESS GIVEN BY REQUEST FOR TEACHERS OF SCRIPTURE AND GEOGRAPHY.

THE land of Israel and its borders belong to the transition zone, between desert and seacoast. With a few good seasons and some leadership there is encouragement to settle and cultivate, often with irrigation schemes, while a series of bad seasons and the irritation thence ensuing promotes the wandering life, with fights for pasture and water. The permanently nomad regions are, in places, almost complete desert, but a good deal of land in Arabia toward Palestine is better described as a high and very poor seasonal grassland. Some peoples have lived mainly on milk and flesh, but many, even wandering herdsmen, have felt the need of grain, and at times of fruit, so that purely self-sufficing nomads have always been rare, at least in S.W. Asia, and from time to time, with great advances in the arts and crafts of the more settled folk, the nomad has been, for a while, at a heavy disadvantage. Some nomad groups, however, acquired craft skill, and wandered in the exercise of their craft; such were probably the early smiths. On the borders of the cultivated land we may thus picture a zone about which nomads have wandered from time immemorial, relying chiefly on cattle, sheep and asses, while in the rougher lands asses and goats would be the main resource. Farther in the desert the nomads bred camels, and after their comparatively late introduction into the area, a few horses. It was apparently the strength of shepherd kings (Hyksos) in horses and chariots that upset the Middle Kingdom of Egypt (date variously estimated 1800—2000 B.C.), and until their day the horse was little known on the desert borders. He is, for example, not mentioned in Genesis till we come to chapter 47, in the days of the famine which seems to be linked with the storming of Egypt by the Hyksos. The horse is ill adapted for travel near the desert, and to this day, if he is used there, camels must carry water for him, and at times must be milked to feed him. Cattle and asses are, therefore, the traditional beasts of burden, apart from the camel, the use of which again did not spread, at least into Egypt, till late, though it was used far earlier in Arabia (Gen. 24 pass). The ass is of little value for wheeled traffic, while ox carts are very slow; moreover, wheeled carts are of small value on long distances over rough roads unless there be organization for repairs. We hear little of waggon traffic in Genesis until we come to the waggons which Joseph sent up to fetch down Jacob (Gen., chapter 45, verse 19). Generally, therefore, in early times we must think of travel either on foot or with loaded asses, and sometimes, for shorter distances, ox carts. But by the time of David's (2nd Sam., chapter 8) and Solomon's (1 Kings, chapter 10, 11-29) organization of trade, there were chariots and horses, and probably organized roads or road-belts, if we may judge from the established traffic-rates (verse 29). It is generally thought there were no international roads for wheeled traffic at least until the days of the Persian Empire. For early times, therefore, we should think of a zone with patches of seasonal pasture promoting travel and intercourse; and many modern writers have drawn attention to such a belt which is to be followed north-westward from the Mesopotamian rivers past the later Palmyra to Damascus, and down southward around the east of the cornlands of Bashan past Bozrah (Isaiah, 63), leaving the forests of Gilead, the gorges of Jabbok, and the sharp slopes of Moab on the west. In wetter periods of climate other more direct ways across the desert may have been practicable, as farther south the way past the modern Teima eastward and the way through Riad are now used. We therefore cannot speak of definite roads in this region, only of belts with fairly frequent water-holes. Conditions of travel in Bible lands were thus largely dependent on the habits of wandering herdsmen with riches in flocks. The nomad shepherd of to-day, usually mounted on a camel, will watch his beasts wandering over a large area, resting, as they do, in the heat of the day when possible, and often moving tent by night when heat and glare are less trying, and moon and stars afford a guide to the man of experience. Wandering animals have to be tracked, and the nomad tracker may find himself alone at any time in presence of a group of strangers. In this connection the custom of desert hospitality has established itself (Exodus, chap. 23, verses 4 and 5). The wanderer is often accorded help, shelter and food for one night, and is then set on his way again (Gen., chap. 18, verses 2-8, c. 19, v. 2-3, c. 24, v. 16-33). This custom is tenaciously maintained, even in times of scarcity, and is extended at times even to solitary members of enemy-groups. On the other hand, the nomad may attack and plunder strangers who are not in relations of hospitality with him. While, therefore, travel by solitary men (but remember Luke, c. 10, verse 30) is not impossible, travel in caravans, often highly organised for defence, is more usual. Along the pilgrim way southward from Damascus, under Turkish rule, there were stations kept up in the name of the government, and it is probable that analogous arrangements for protection of a route were in existence long ago.

As great cities and human centres grew up they became foci of trade, and in Bible lands and times we have Babylon, Damascus, Sidon and Tyre, and the capital of Egypt for the time being as of outstanding importance. From Babylon, caravans might either go around the north edge of the desert to Damascus and Bosra, or across the desert via routes farther south. From Damascus to the coasts of Phœnicia there were difficult ways across the hills of north Palestine, easier ways via Bashan and the plain of Esdraelon, or intermediate ways crossing Jordan north of the Sea of Galilee and the lower Galilean hills north of Nazareth.

From Egypt there was the coast way from the north end of the isthmus of Suez to Gaza, and so up the Philistine coast to Sharon, Samaria, and Esdraelon, or there were ways across the middle of the isthmus to Gaza or to Beersheba, and from the latter to Hebron; there were also ways across the south part of the isthmus to the Gulf of Akabah, thus making a contact with the north and south route already mentioned (E. of Moab, etc). The northward road from the Gulf of Akabah had also branch ways to Hebron. It seems to have been through his schemes of matrimonial alliance and religious toleration that Solomon went so far towards controlling and assuming the safety of the routes through Palestine, and so acquired his prestige as a trader and his great wealth. He seems to have been paid for keeping the roads safe.

Egypt, Gaza, Sharon, Dothan, Esdraelon, Bashan, Damascus, Assyria, Babylon, is thus one great way, while Damascus, Bashan, Bozrah, Akabah is another. Both were familiar to wanderers on the hills of Palestine, who thus looked down from their primitive life upon the wealth and luxury of embassies, caravans, and armies moving along these highways of ancient kings. The prophets, as leaders anxious to keep the people in their early simplicity, made endless use of this matter of popular observation in their philippics, and among them from this point of view Amos stands out strongly.

Travel was undertaken for personal reasons, as when Abram's servant fetched Rebecca (Gen. 24), or as wandering with flock-herds (Abram, Lot, etc.), or for trade (Ishmaelites from Gilead, Gen. 37, v. 25). Trade arose easily among wanderers who could carry articles of small bulk and great value to places where they might be in demand. Slaves, spicery, balm, gums, myrrh, linen yarn, wool, gold and precious stones, salt, alkali, silver, copper, silks, dyes, medicinal herbs, dates, honey, curdled milk, fine ivory work, are all possibilities here. In the great cities the law of hospitality would be too great a burden, and the inn arose as a substitute, which spread to the smaller towns in time, but the perpetual danger from nomad raids, which made the townsfolk build walls, also made them chary of the unknown traveller (Gen. c. 19, v. 4, Judges, c. 5, v. 19-22), and many are the complaints of the wandering tribesmen against the townsfolk. In the better regions, as, for instance, Palestine, religious centres drew travellers (pilgrims) at festival time, and where people gather there is trade, so places like Shechem, Bethel, Gilgal, and Hebron, illustrate the early travel associations of religion and commerce, and some of them aroused the wrath of Amos the prophet.

No doubt within Palestine itself there may have been fairly definite roads near the larger towns, but it should be realised that, in that country, patches of cultivation were for the most part merely enclosed from the general grassland and scrubland, and it was on this that travel for the most part occurred. Probably bands of men like David and his fellows (1 Sam., c. 25, v. 7) oscillated between police work and brigandage along main zones of travel, according to their opportunities and the condition of the government of the country.

The Israelites have always been averse from seafaring, and their maritime pre-occupations are made an opportunity for criticism of Dan and Asher (Judges, c .5, v. 17). Even Solomon's efforts do not seem to have had lasting success on the sea. It thus comes to pass that we know little from the Old Testament about sea travel, though archæology helps us greatly (especially in connection with Ezekiel, c. 27) to appreciate the network of sea trade of the various periods concerned, since Caphtor (Crete) rose to greatness in the 3rd Millenium, B.C. It must suffice to say that attempts have been made to place Tarshish in South Spain, Ophir in S. Africa, or with greater probability in Malaysia, and so on.

The Romans stood out among their contemporaries as makers of roads and of laws, and, with their advent, problems of travel were radically changed, great causeways were built, and traffic concentrated on them which had once wandered over a belt of land. Probably in forest regions there were concentrated ways before Roman times, or of native designing in or about Roman times, as we judge from archæological evidence in Western Europe, but it is doubtful whether these non-Roman ways showed much engineering work. The Romans as road builders and keepers of the peace give travel an entirely new aspect in the New Testament, and Acts, c. 8, verses 27-28, indicates the use of wheeled vehicles over long distances, while the light shed by Paul's voyage on sea travel is very valuable indeed.

Linguists tell us that until Greek influences appeared the trading terms in use in S.W. Asia were all Semitic, so that the Semitic speaking peoples have been the great traders of their region, and it is quite possible that, instead of looking for an original home of Semitic people and speech in the heart of Arabia somewhere, we should think of it as a language fashioned along the travel routes mentioned in this article, and spreading and differentiating among the more settled peoples near by.

The subject may be studied in C. M. Doughty's "Arabia Deserta," Sir G. A. Smith's works, and especially his article on Trade and Commerce in the "Encyclopædia Biblica." Robertson Smith's "Religion of the Semites" also gives valuable suggestions, as well as Palmer's "Desert of the Exodus." Philby's "Heart of Arabia" is a new and invaluable contribution to knowledge. Huntington in "Palestine and its Transformations," deals suggestively with some aspects of the subject treated here.

H.J.F.

THE TEACHING OF GEOGRAPHY IN ELEMENTARY SCHOOLS.

By Ernest Young, M.A.

1. Organise your Work.

TEACHERS in Elementary Schools take their work in Arithmetic seriously; in Geography they do not. The following is a perfectly typical experience. I heard a teacher giving a lesson on Dutch children to a very low standard. I asked her: "Why do you deal with the Dutch at this stage?" and she replied, "Because they are so interesting and wear such quaint costumes." Because they are so interesting!—for a similar reason you might devote any number of hours to jig-saw puzzles or to watching kittens chase their tails.

Arithmetic is recognised as a progressive subject, where one step follows another in some definite order, and the teacher carefully maps out a syllabus in which each step has its proper place and its due proportion of time. This is not the case with Geography. A teacher in a rural school will alternate Europe with America, and the British Empire with anything, perfectly oblivious of the fact that all regions are not equal in difficulty or that geography deals with ideas as well as facts and that ideas must follow one another in some kind of relationship to age and, further, that certain ideas and groups of ideas are better taught in connection with one region than with another.

The teachers, and there are hundreds, who have to take two, three or even more classes in one room, never think of alternating two Arithmetic syllabuses. You can't take cube-root, if you take it at all (which Heaven forbid), before simple addition in one year and simple addition before cube-root in the next. Something of the same kind of statement is true of geography, though the order of progression is rather more elastic.

The business of the teacher, whether with one standard or seven to look after, is to sit down quietly, pencil in hand, and think out what a child should learn from the age of entrance to that of leaving. The list will include :—

1. Natural regions, with the main facts to be taught about each.

2. Geographical *ideas,* such as the functions of market towns, ports and capitals, what constitutes a nation, a country, etc., what factors determine town sites, what conditions govern production, and so on.

3. Leading facts in physical geography, such as the formation of deltas and fold mountains, the erosive powers of water and ice, the story of the formation of coal.

4. The study of the home region; each region will vary. You can't get the same facts at first hand in East Anglia that you can get in Wales.

5. Various types of mapping.

6. Various types of exercise.

7. Experiments in practical geography. The list could be extended, but it is not my function to lay the foundations of a pedagogical nightmare.

When the list is as complete as circumstances allow, the items can be arranged in order of difficulty and the various geographical ideas and facts allotted to the various regions where they are well illustrated and at an age when they can be properly appreciated. In some such way a geographical syllabus should be constructed, and the geographical work of the school organised.

It will be seen that in all this there are no ready made schemes. Each district, perhaps each school, needs its own scheme and the wonderfully complete arrangements offered by various publishers are a delusion and a snare. They are meant only for the lazy and the ignorant and there is no room for these characteristics in the mental make-up of the modern teacher.

To organise work in this way means knowledge and experience, and I am well aware that it is an impossibility for every teacher in an elementary school to be a specialist. But in every school where there are several teachers, at least one should be a member of the Geographical Association and in charge of the syllabus. Head teachers of elementary schools should learn to do what the heads of secondary schools do, and that is—abdicate. No head of a secondary school ever attempts to draw up the syllabus in every subject; he doesn't know enough, and he knows he doesn't; he abdicates, in favour of his several specialists.

The Ice Age.—It is a noticeable fact that in central Wales there is an extraordinary absence or poverty of development of the moraines that might have been expected to be left in the valleys at the end of glaciation. I speak only of Mid-Wales, because I do not know North Wales and South Wales sufficiently well to speak authoritatively, but I imagine that the same might be said of these areas. There is a fair amount of boulder clay here and there smeared over the surface, especially on the shoulders of hills, but with the exception of the entrance to the Dovey valley, where moraines apparently exist, there are only a few solitary examples. Instead, there is an extraordinary amount of water-deposited material right up to the heads of the valleys. This is pretty certainly of glacial origin.

The obvious conclusion to be drawn from these facts is that, whatever may have been the conditions at a glacial maximum, the end of a glacial period was marked by a very great flow of water from the melting of glaciers, from the melting of recent snow, and from rain which washed away the material that would otherwise have accumulated as moraine. In view of the proximity of Wales to the Atlantic this is, of course, not wonderful, but it makes the mode of termination of a glacial period in Wales very different from that in the Alps.

A further deduction may be drawn. As each glacial period terminated, and probably also as it began, by very considerable waterflow down the valleys, it is to be expected that it would not be easy to find traces of successive glacial periods. The absence of such traces does not imply the non-existence of such periods. Moreover, Mid-Wales is near the generally accepted southern limit of the Ice Sheet during one or more glacial maxima, and there may have been many un-coverings and re-coverings here, facts which would militate against heavy accumulations. J. FAIRGRIEVE.

Mr. E. F. Elton, Burleigh Court, near Stroud, Glos., has a complete set of back numbers of the publications of the Royal Geographical Society for sale. Please write to him for details.

SOME NOTES ON THE ECONOMIC GEOGRAPHY OF BURMA.

By L. Dudley Stamp, B.A., D.Sc., A.K.C., F.G.S., A.M.I.P.T., I.E.S.,
Professor of Geography and Geology in the University of Rangoon.

I. Introduction.

BURMA is the largest and, if excess of revenue over expenditure be taken as an index of wealth, one of the richest provinces of the Indian Empire. It can boast the third port of the Empire, Rangoon being without rival as a rice port. The province is, therefore, well worthy of considerable attention, not only for what it is, but for what it may become since Burma is, in many ways, the least developed part of British India. Since January 1st, 1923, Burma has been granted a far larger measure of self-government than formerly, a Governor has replaced the Lieutenant-Governor, whilst the appointment of Burmese Ministers and the reorganisation of mass representation has made possible a real co-operation between Burman and Englishman, which bids fair to produce the best results for the country as a whole. The object of these notes is to review the present position from a geographical standpoint. For the sake of completeness it is necessary to repeat a certain amount of general information which may be found in most geographical text books, but an effort has been made to co-ordinate less readily accessible information and most recent data and to incorporate some of the writer's personal observations in the country. In existing text books there is often considerable uncertainty as to how to deal with Burma. Its economic geography is treated as part of that of the Indian Empire, yet the province is frequently recognized as essentially a region of Indo-China. In so far that it is distinct in nearly every way from the remainder of the Indian Empire, its separation therefrom is fully justified; but it is impossible to treat Burma with its diversified relief and climate as a single natural region.

There are numerous excellent books on Burma, some of which are noted later, but they are of a type scarcely to be found in a teacher's library and the extraction of a simple geographical outline would prove a laborious task and would even then be incomplete in several respects.

Burma, including the Shan States, has an estimated area of over 260,000 square miles or more than twice the size of the British Isles. It was added to the British Empire piece by piece commencing with Arakan and Tenasserim in 1826. The old distinction between Upper and Lower Burma, though still often used, has really only an historical significance. The Shan States are still ruled by their Native Princes or Sawbwas, who acknowledge allegiance to the British Crown and act under the advice of British residents.

II. Geology and Physical Geography.

The physiography of Burma is controlled almost entirely by the geology, and the country falls naturally into four divisions, each of which runs from north to south the length of the land. These four divisions are :—

1. The Shan Plateau on the east.
2. The fold range of the Arakan Yomas on the west.
3. The central strip, roughly the basin of the Lower Irrawaddy and its tributary the Chindwin and of the Sittang rivers.
4. The narrow strip, scarcely separable from the Arakan Yoma, forming the Arakan Coast.

1. *The Shan Plateau.* The whole of the east of Burma, including the Shan States and continuing southwards towards the Malay Peninsula as the region Tenasserim (including Tavoy and Mergui) and northward to embrace the Ruby mines district, consists of a complex of old rocks. The district is sharply marked off from the Central Tertiary region on the west, and there is often an abrupt drop of more than two thousand feet from the edge of the plateau to the neighbouring alluvial plains. The explanation of this curious feature lies in the presence of a great fault separating the two regions. Forming a narrow strip right down the western edge of the plateau are crystalline gneisses and schists, but further east the complex consists of palaeozoic rocks—especially limestones—of varying age. The strata are intensely folded into long north and south folds giving a curious parallel alignment to the hills and valleys. The youngest rocks known to be involved in the folding are of the same age as the Lias Clays of England, so that the folding which produced this "Malayan Arc" is rather later than the Hercynian folding which at the end of the Carboniferous period caused the principal folds in the coalfields of England. In later times the Shan Plateau almost certainly formed land, but hollows in its surface were occupied by large lakes. Remnants of the latter still remain, but for the most part the basins have become filled in, and in places extensive seams of lignite occur and elsewhere some oil shales. The old gneisses furnish stone which, water-borne from the Moulmein Coast, is being extensively used for road-making around Rangoon. Associated with slightly younger rocks and later intrusions are the wolfram and tin deposits of Tavoy and Mergui which assumed such a great importance during the war. In the Northern Shan States, associated with igneous masses in the Shan Plateau massif are the enormous silver, lead, zinc deposits of Bawdwin now being worked by the Burma Corporation. Coal of good quality, but extremely crushed and powdered by the intense folding, occurs in the Liassic rocks of the massif, especially near Kalaw in the Southern Shan States, and may become of importance in the future. From north of Mandalay come the world famous rubies of Burma, whilst the largest deposits of jade (strictly jadeite) in the world are situated still further north.

2. *The Arakan Yoma.* It is convenient to deal with this region next since the presence, at least in places, of a core of old gneisses gives it some relation to the Shan Plateau. The ridge of the Arakan Yoma broadens out northward into a series of desolate, almost uninhabited ranges (the Chin and Kachin Hills) and is linked up with the eastern end of the Himalayas. The range is also continued southwards through the Andaman and Nicobar Islands into Sumatra and Java, and the whole constitutes what is usually known as the Burmese Arc of the Alpine-Himalayan system of folding. The rise of the Arakan Yoma commenced in late Cretaceous times and through Tertiary times an arm of the sea—the Burmese Gulf—occupied the region between the Arakan Yoma and the Shan Plateau. Great rivers—of which the Chindwin and Irrawaddy are but remnants—flowed down from Tibet into this Gulf and have gradually filled it up with a mass of sediment—a process which is still going on in the shallow Gulf of Martaban.

At the present day the Arakan Yoma forms a remarkable barrier, scarcely crossed by a mountain track, much less by road or rail. Until one of the railway schemes for linking Upper Burma with Assam matures it is perfectly correct to say that the only link between Burma and India is by sea. The range rises to over 10,000 feet in Mount Victoria (lat. 21°17'N).

Geologically the range is almost unknown and its mineral resources almost unexplored. Inaccessibility is at present the great drawback to any attempt at exploitation.

3. *The Central Region.* This embraces all the more developed regions of Burma. It occupies the site of the "Burmese Gulf" of Tertiary times and is built up almost entirely of Tertiary rocks. The earth movements which first produced the ridge of the Arakan Yoma in late Cretaceous times continued to operate throughout Tertiary times, culminating towards the end of the period. The Arakan Yomas, then, are a great fold-range, consisting of a series of parallel folds which gradually become smaller and less intensely folded as one approaches the broad valley of the Lower Irrawaddy River. To the east of the river in the southern part of the Central Tract and forming a low but somewhat inaccessible divide there is another subsidiary fold range—the Pegu Yomas. It is on the southernmost spur of this range that Rangoon is situated, to the west is the valley of the Irrawaddy, to the east that of the Sittang. In former times the Upper Irrawaddy flowed almost directly southwards into the Sittang, along the eastern side of the central divide, whilst the Chindwin-Lower Irrawaddy formed the main river on the western side. The softer Tertiary rocks—especially the latest beds—have been largely worn away, and there are numerous low-lying areas largely covered by recent alluvium. The abrupt line between the central tract and the Shan Plateau on the east has already been noted, but westward from the Irrawaddy there is a gradual passage from the low lands, through the foot hills of the Arakan Yoma to the range itself. In the south of the central tract there is of course the great delta of the Irrawaddy. The Tertiary rocks of Burma were laid down under conditions suitable to the accumulation of oil and the formation of seams of brown coal or lignite. The latter has not yet proved of commercial importance owing to its friable nature when mined, and for other reasons. With regard to oil, where the folding of the rocks is intense it seems to have been squeezed out of the rocks as it were, and it is only in the central tract—roughly along the line of the Chindwin—Lower Irrawaddy—that there are gently-folded open domes suitable for its accumulation in quantity. For its size the little field of Yenangyaung is, perhaps, one of the most wonderful oilfields in the world, something like 3,000,000,000 gallons having been produced in the last sixteen years from an area of a little over 1¼ square miles, and the field is far from being exhausted. The Tertiary rocks of the extreme north of this central tract yield the well-known Burmese Amber.

4. *The Arakan Coast.* This region is in reality formed by the western foot hills of the Arakan Yomas, the depression between the ranges being occupied by arms of the sea. The coast forms one of the few typical pieces of Pacific type of coast line to be found away from the Pacific Ocean. The region is accessible from the main point of Burma only by sea.

III. CLIMATE.

Burma is essentially a monsoon country. As with the greater part of India, there are three seasons, a cold season commencing in reality about November and merging gradually into the hot season, which may be said to last from early March to May. The monsoon breaks in earnest about June 15th, but is heralded by thunderstorms from about the middle of May. The rains are really over by September, and October, at least in the damper regions, is an intermediate month, which tends to be unpleasantly hot and damp. During the cold season and the early part of the hot weather the northerly and north-easterly breezes which blow down from the mountainous regions to the north are comparatively cool and Burma is spared the terrible extremes of heat which are experienced by the plains of India. The effect of the south-west monsoon is profoundly modified by the physiography of the country. The accompanying sketch-map shows how the "dry belt," where the rainfall drops to 20 inches, is due to its situation on the lee of the Arakan Yomas. Thus one finds such curious contrasts as Yenangyaung

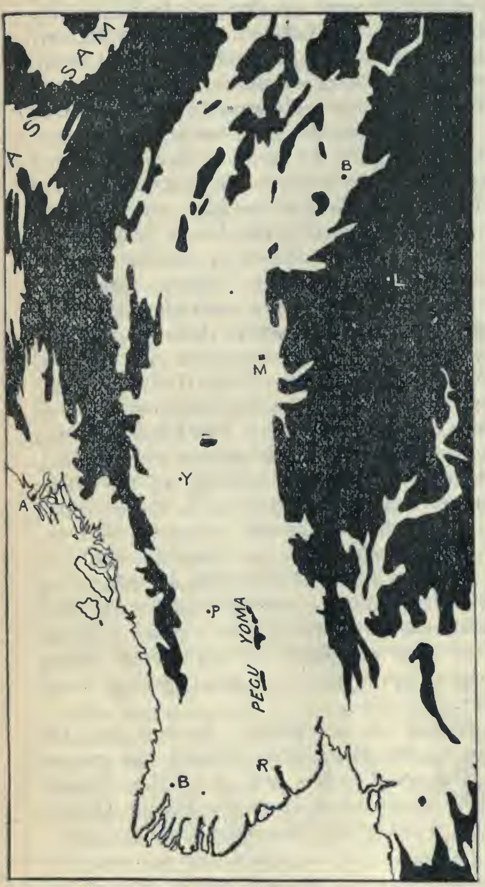

Fig. 1.—The Relief of Burma.
Black=Land above 1,500 ft.
L.D.S. and E.C.S.

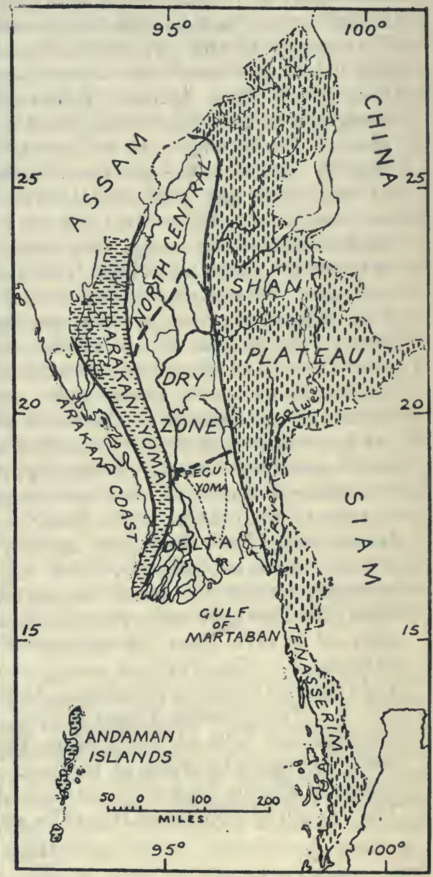

Fig. 3.—The Natural Regions of Burma.
L.D.S.

All the illustrations accompanying this article, and appearing elsewhere in the "Geographical Teacher," are printed from blocks made by Messrs. Bale and Danielsson, Great Titchfield Street, W.

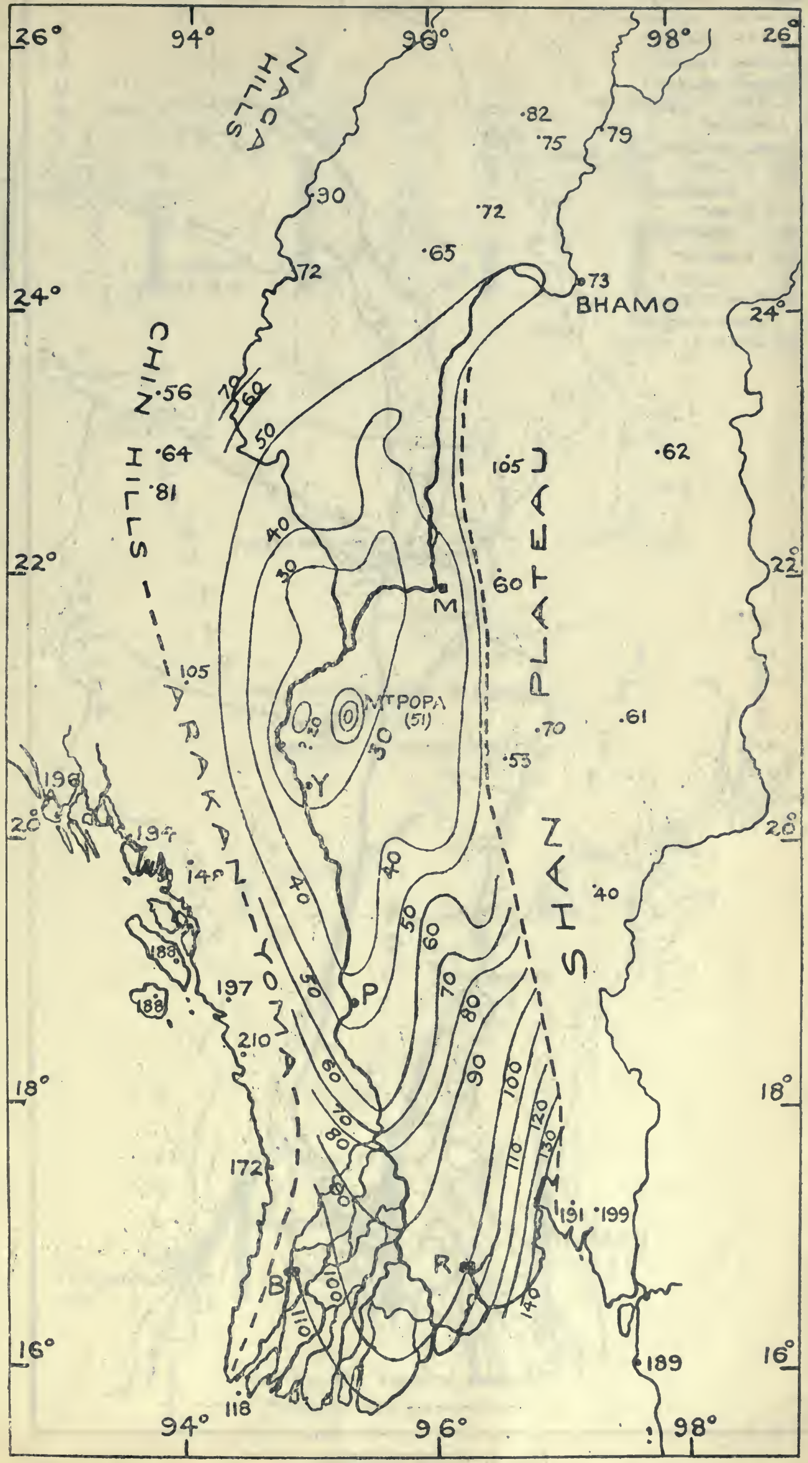

Fig. 2.—Actual Annual Rainfall of Burma (in inches). L.D.S. and E.C.S.

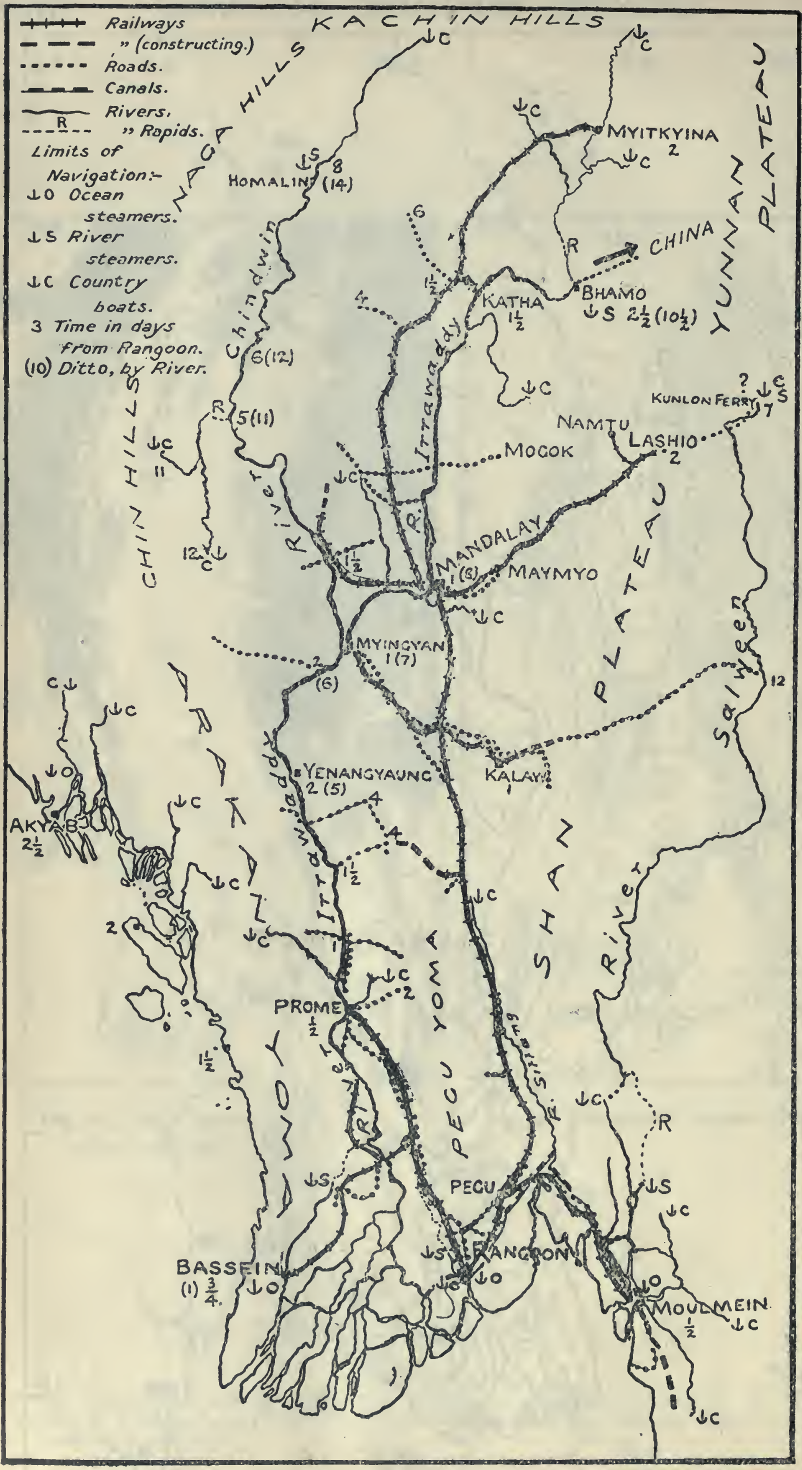

Fig. 4.—Communications.

(Note.—Time in days from Rangoon; the figures given are based on the best ordinary means of transport). L.D.S. and E.C.S.

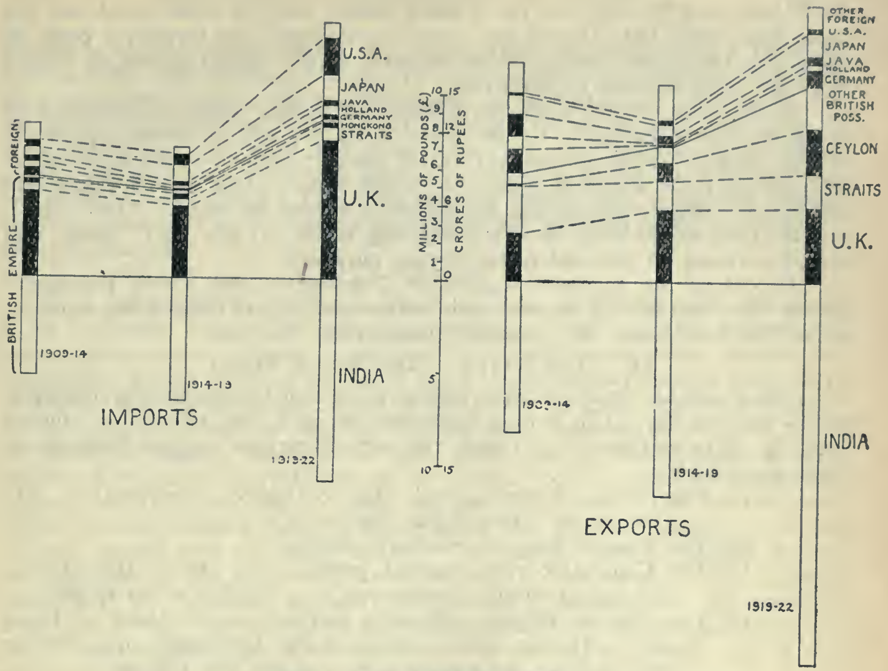

Fig. 5.—The Trade of Burma.

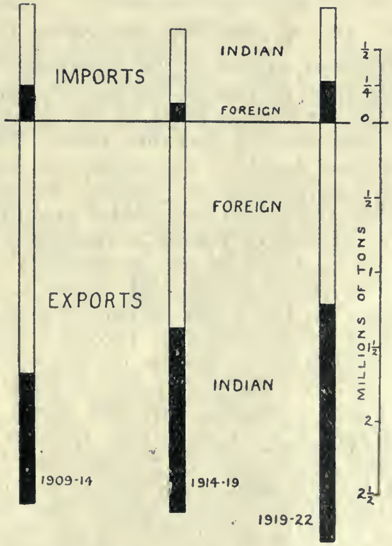

Fig. 6.—The Trade of Burma.
Tonnage of principal items.

25.52 ins., and Myebon, on the Arakan Coast, only 90 miles west as the crow flies, with 194. From the agriculturist's and the forester's point of view it is the actual rainfall which matters, so the figures shown on Fig. 2 have not been reduced to sea level.

In the drier regions both the diurnal and annual ranges of temperature are greater than damper. In the heart of the dry belt a diurnal range of 40° or even 50° is not uncommon, in the damper regions—even in Rangoon (90---100 in.) 10° would be nearer the usual figure. The smaller range and the steady temperature during the monsoon should be noted. The "rains" are far from unpleasant, though everything tends to get very damp and coke-fires must be resorted to for drying purposes.

Except in the southern regions of Tenasserim and Tavoy practically all the rain falls during the monsoon season and, apart from a few showers about the New Year, the remaining months are rainless.

IV. The Natural Regions of Burma.

When one has gained a clear mental picture of the simple physiography of Burma (see Fig. 1), it is only necessary to add the effects of climate (see Fig. 2) to find how very simply the natural regions suggest themselves. They are roughly—

(a) The Shan Plateau, and its southward continuation into Tenasserim (Mergui and Tavoy).
(b) The Central Region, northern portion.
(c) The Central Region, central portion, or the "Dry Belt," passing gradually southwards to a rainfall of up to 60″.
(d) The Central Region, southern portion, or the Delta. There are really two deltas—those of the Irrawaddy and Sittang separated by the southern part of the Pegu Yoma.
(e) The Arakan Yoma.
(f) The Arakan Coast.

The main features of these regions have already been noted above, and the climatic features are apparent from the figures. Other features will be noted below.

V. The Natural Vegetation of Burma.

A great deal has been written on the vegetation of Burma, but practically always from the point of view of the forestry expert. The writer considers that the existing vegetation maps of the country convey what is in many ways a false impression in that they show "Forest," "Grassland," "Scrub" and "Cultivated Land." The writer has only studied in detail an area of about 4,000 square miles in Central Burma, but from general observations whilst travelling over the country ventures to make the following statements. The climate of Burma is essentially a woodland or forest climate, and there are no traces of true grassland at least in the central tract. Along the river, there are indeed extensive tracts of "elephant grass," but they are what the Ecologist calls " serial " or " non-climax " communities, i.e., they would eventually become forest if given time. Yet the climate is not inimical to the growth of grass; for grass forms the principal undergrowth in all the drier types of forest, and where the trees have been largely cleared a pleasing park-like aspect is the result. Taking for the moment the central tract alone one finds a gradation from the evergreen tropical rain forest through the monsoon forests (of which the teak forests are by far the most important) to savannah forests and then, in the dry belt, to thorn forest, thorn scrub, and finally to semi-desert. Taking the tract as a whole, the rainfall is the determining factor in the distribution of the vegetation, but when one studies any district in detail, it is found that the geology has an enormous influence. As a result of a change of geological formation one may find within a stone's throw of one another a leafy monsoon forest, an impenetrable thorn-forest or a dried-up thorn-scrub. The Arakan Yomas are forest clad, and elevation seems to have little effect until 5,000 feet is passed. The writer has not studied the vegetation of the Shan Plateau, but elevation seems to come into play at about 4,000 feet, and some fine pine-forests are seen locally. Large areas are covered by rolling downland almost European in aspect and probably due to the limestone subsoil. The delta and the lower lying tracts are almost entirely given over to rice cultivation, but on the seaward margins mangrove swamps flourish.

VI. Fauna.

It is impossible to deal with either the flora or the fauna in the small space available, and it will suffice to mention a few of the animals of general importance. Burma is not over-run by obnoxious pests; snakes and unpleasant insects for example being much less abundant than in most parts of India. Yet the sportsman can find plenty for his gun, tiger and elephant in many parts as well as wild buffalo and many animals of the deer tribe. As beasts of burden the elephant is of great use in the hills and forests, mules are more or less restricted to the Chinese borders, and a considerable amount of coolie-carrying is done by the hill-tribes. The bullock cart, drawn by two humped bulls, is universal in the central region, and has recently spread over the Shan States. The humped bull is replaced by the water-buffalo in the Delta and wetter regions. The small, wiry, Burmese pony, with its curiously smooth "single-step" motion, is characteristic especially of the central tract. Mosquitoes are fairly numerous, notably in the damper regions just after the rains, but malaria is sporadic in its distribution, Rangoon, for example, being practically free.

VII. Agriculture and Forestry.

It is not difficult to see that both Agriculture and Forestry vary greatly according to the natural region. In all the hilly parts there are vast forests of enormous value. These are controlled by the Government, and most of the important areas are included in the Government Forest Reserves. The extraction of the timber is for the most part carried out by private firms licensed by the Government. At the present time practically the only timber which pays for extraction is teak, but the time cannot be far distant when the world will know more of some of the other splendid woods of Burma.

Shan Plateau Region. The vast possibilities of this region have scarcely yet been realised. At present the country is too inaccessible for forestry to be of importance and agriculture is restricted to the immediate needs of the native inhabitants. Tea is grown, and coffee has been tried in a desultory manner, but vast stretches of suitable hill-side are untouched by the hand of man. The great plains formed by the old lake basins amidst the hills seem to offer ideal wheat lands, whilst the growing of Mediterranean or British fruits is wholly untried. The northern part of this area is largely forested, as are the wet regions of Tavoy and Mergui. The mother-of-pearl industry of the latter region may be noted.

Central Tract (*Northern Part*). To the west, fine teak-forests cover the foot hills of the Arakan Yomas, and the timber is extracted in the more accessible parts. The inhabitants grow sufficient rice for their needs, they have a primitive but very effective method of terracing and irrigating the valley floors for the purpose. By means of a system of "pipes" of hollowed out half-logs a mountain stream is "tapped" in such a way that neither too much nor too little water is drawn off.

The Dry Belt. This belt includes vast areas of alluvial land, and the drier parts, notably north-east of Minbu and in the Shwebo District, are irrigated and produce large quantities of rice. Rain-fed rice can be produced when the rainfall reaches 45 inches (as near Prome). The sandy soils of the dry belt now produce large quantities of ground-nuts (for oil), also sessamum; cotton would seem to have an important future on the gravelly soils; chilies, and numerous native vegetables are grown especially on the banks of fertile alluvium left dry by the river in the low-water season. These alluvial stretches have been proved ideal for tobacco. It should be noted that most of the mineral oil of Burma comes from this dry belt. In the drier scrub-lands the principal tree is an Acacia, from which Cutch (a dye) is produced by boiling the heartwood. Southwards as the rainfall increases the forests become important, on the loose sandy soils there are vast areas of "Ingyin" and "In" trees whose woods, less valuable than teak, are much used locally. On the slopes of the Pegu Yomas the Teak forests are important owing largely to their relative accessibility.

The Delta. This area is, of course, the great rice producing area, and there is very little waste land. The network of channels at the mouth of the Irrawaddy affords ready communication. Coconuts and products derived therefrom are relatively of slight importance. The forests which clothe the spur of the Pegu Yomas between the deltas of the Irrawaddy and Sittang are also exploited.

The Arakan Yoma. Large areas of this forest-clad region are still unmapped—almost unexplored and the resources unknown.

The Arakan Coast. This region may be termed self-supporting, most of the available land being devoted to rice, but it would seem that the wealth of the forests clothing the foot hills of the Yomas is still untapped.

It may be noted in passing that Burma is disappointing as far as fruit is concerned. Bananas and the non-indigenous "Papais" (called steamer-fruit by the Burmans, indicating its foreign origin) may be obtained in most jungle villages and mangoes in season, but other fruits are far from wide-spread.

VIII. COMMUNICATIONS.

Central Burma, which is by far the most important part of the province, is essentially the land of the Irrawaddy. Practically every log of teak exported from the country is floated down the river, while every kind of craft from the well-equipped steamers of the Irrawaddy Flotilla Company to the hollowed-out log still quite commonly to be seen bring down their quota of rice or cotton or grain. The greater part of the oil from Yenangyaung and Yenangyat is now pumped down by a pipe-line direct to Rangoon. The Irrawaddy is navigable for large craft almost to the Chinese borders—to Bhamo, over 900 miles from its mouth; its principal tributary the Chindwin is also navigable by steamers for several hundred miles. The Chindwin steamers are curious craft, broad flat-bottomed boats with a large paddle wheel at the stern, which contrive to combine a carrying capacity of several hundred tons with a remarkably shallow draft—even less than 18 inches except when heavily laden. The Sittang is navigable for a short distance, but the dangerous bore and currents near its mouth render it of little use. The other great river, the Salween, has rapids about 100 miles from the mouth. Above the rapids it is navigable, but is little used.

The railways rank second in importance. They are all metreguage and suffer from the inevitable defects—notably slow travel—of a narrow track. It would be unfair to accuse the Burma Railway Company—which many years ago took over the railways from the Government—of complete lack of enterprise, but railway progress in Burma has been slow. There is, for example, no means of reaching Yenangyaung—the centre of Burma's oil industry, except the river. It is less than 300 miles from Rangoon and one can cover the first 170 miles to Prome by train in a night, but the whole journey is covered in but little less than two days. A considerable amount of rice is carried by rail, but the cost is too great for timber. The railway mileage is rather over 1,600 miles.

It is when one considers the roads that one has every right to complain. The total mileage of metalled road is scarcely more than that of the railways; there is not even a road from Rangoon to Mandalay—in fact, only two roads run out of Rangoon, both along the same lines as the railways—one to Prome and one to Pegu. It is absurd to protest that such roads as exist are but little used, and that an expensive upkeep is involved for no return. When one realises the hundreds of people who keep light vans, lorries or cars, when they have only about half-a-dozen miles on which to run them, the progress in road transport which would result from the institution of a system of trunk-roads with "feeders" can readily be imagined.

Away from the navigable waters, the railways and the almost negligible roads of Central Burma, one is restricted for all ordinary purposes to the bullock cart. The speed averages 1½ to 1¾ miles per hour with 15 miles as a good daily average. In the dry weather the tracks run indiscriminately across everything, in the wet weather a village may be isolated for weeks together, or even permanently, until the paddy fields dry up. Even at the end of the rains a swollen "chaung" or water-course may hold up the traveller for days. The tracks worn by the bullock-carts in the drier parts are of interest. The carts must all be of the same guage and are invariably drawn by two bullocks who walk in the same ruts as the wheels. The cart is yoked down to the beast's necks, so that it cannot overturn without dragging one bullock right over, hence it is of little matter if one rut is worn two or even three feet lower than the other.

In the map showing communications an attempt has been made to show all developments up to date, and at the same time the distance from Rangoon to various places of note is shown in days of average travel by the best available means. A word is needed in praise of the fine roads which have penetrated the Shan States. Road metal is, of course, abundant, a statement which cannot be made of Central Burma, and the roads have been constructed partly for strategic reasons (as has also the S.S.S. Railway) and partly by the native princes themselves. Prior to the building of the roads wheeled traffic was almost unknown in the Shan States.

Regarding the trade routes out of Burma, there are two main land routes to China—via Kunlon Ferry and Bhamo; that via Bhamo is the more important. There is really no land route to India, though there are passes from the Upper Chindwin through Manipur State into Assam which may eventually be followed by railway. The sea-borne traffic is overwhelmingly the more important. It should be noted that Burma is a backwater in that no important trade route passes through the country.

IX. ECONOMIC.

The imports and exports of a country are by no means always an indication of the main industries of the people in many of the tropical countries. The exports represent rather the result of the superfluous energy of the people, the imports the result of the desire of the people for things which are, in the first place, luxuries, though afterwards they may rank as necessities. Now the Burman has little superfluous energy, whilst his tastes, until altered by contact with western ideas, are simple. The trade of the country is, then, almost entirely the result of alien enterprise.

Industries. It is sufficient to say that practically all parts of Burma can be, and formerly were, self-supporting. Space forbids the cataloguing of the native industries, to this day every housewife in the villages can be seen weaving "lungyis" for the household at the primitive loom beneath her hut; every man can build his hut or his bullock cart; with primitive implements he tickles the soil and it laughs with a harvest. The maker of earthen pots or chatties is not far to seek, though some industries are more localized, such as the lacquer work at Pagan or the silk-weaving around Mandalay. The Burman is a great fisherman, and fish-curing is important round the coasts.

Trade. It is necessary to consider the trade of Burma—as with most countries of the world—under three headings—before the war, during the war and after the war. Conditions are not yet sufficiently settled to know what will be the ultimate trend in many directions, but the latest figures available (for 1921—22) in many cases give a good indication. Bearing in mind fluctuating value and varying rates of exchange quantities are more reliable for purposes of comparison than values. (Compare figs. 5 and 6.) Concerning imports, Burma over-purchased enormously in 1920-21—during the trade boom after the war—and was overstocked with many goods in 1921-22. The result is that the import figures for 1921-22 are probably abnormally low. In the few cases below where values have been stated, rupees have been converted into sterling at the rate of Re. 1 — 1s. 4d. This is the present value of the rupee, though during the war it reached as much as twice that figure.

Exports. There are three of major importance. Rice takes the first place. The average for the pre-war quinquennium was nearly 2½ million tons per annum, during and since the war the quantity exported annually has been about 2¼ million tons. This represents a very large percentage of the total exported by the Indian Empire. It is noteworthy that before the war (average for five years) 25 per cent. went to India; rather over 1 per cent. to Ceylon; 5 per cent. to the United Kingdom; 12 per cent. to the Straits Settlements; 13 per cent. to Germany; 10 per cent. to Holland; 7 per cent. to Austria. Other large consumers included Java and Japan. During the war, the demand in India more than doubled, as did that in England, that in Ceylon more than quadrupled. Ignoring the figures for 1919-20, 1920-21, those for 1921-22 show that 44 per cent. went to India; 11 per cent. to Ceylon; less than 5 per cent. to the United Kingdom; 6 per cent to the Straits; whilst Germany reappears as taking 9 per cent.; Java remains important, but Japan less so. The rice trade was valued at nearly 25 million pounds last year as against rather over 15 million before the war.

Petroleum and petroleum products come second in importance, and on the whole show a steady increase reaching 592,000 tons in 1921-22, valued at nearly 6½ million pounds, apart from 33,000 tons of paraffin wax and candles valued at over 1 million pounds. By far the greater part of the oil goes to India, but the wax and candles to Europe, China and Japan. The third export of importance is timber—especially teak—and has remained for some years comparatively steady at about 140,000 tons, valued at over 1½ million pounds sterling. The proportion taken by India has steadily increased, and last year's foreign trade was only about 10 per cent. of the whole. Other exports of importance include raw cotton, lead and grains or pulse. The articles for which Burma is famous—rubies, amber and jade compare but poorly in value.

The total exports of Burma averaged £18,000,000 in the five pre-war years, but reached well over £35,000,000 in 1921-22. These figures, however, convey a false impression, and tonnage forms a more reliable guide. It shows on the whole a gradual growth.

Imports. Of first importance are cotton goods, including twist and yarn, the total value of the goods imported being well over 3 million pounds in the years of pre-war quinquennium and over 6 million last year, which even so shows poorly against nearly 9 million in 1920-21. In pre-war years the United Kingdom supplied (by value) nearly 63 per cent. of the whole;

India over 23 per cent; the only other important contributor being the Netherlands. During the war—notably in 1918-19—Japan appears as an important factor in all classes of goods. The figures for last year show that she is losing the market for white and coloured goods, but still holding it for grey, of which she supplied 11 per cent. more than the United Kingdom. In 1921-22, the United Kingdom supplied roughly 33 per cent., India over 54 per cent., Netherlands 6 per cent., and Japan 5 per cent., of all classes of goods.

Machinery, hardware and manufactures of iron and steel totalled 4¼ million pounds sterling in 1921-22. Machinery, etc., for the oil industry was responsible for more than a third, and of this the United States supplied more than 1 million pounds worth. The United Kingdom supplied well over half the whole.

The import of coal reached well over half a million tons last year, valued at £1,250,000. India supplied over 60 per cent. and the United Kingdom about 10 per cent. East Africa and Japan are both important suppliers. Other imports include jute goods, sugar, liquors and silk goods. The total imports were valued at over £13,200,000 before the war (5 year average) and last year reached £24,100,000. Comparison of tonnage shows a heavy drop during the war, but a marked recovery last year, well ahead of the pre-war average.

Shipping. Roughly 80 per cent. of the tonnage entering and clearing from Rangoon (exclusive of coastal trade) was British in 1921-22, the only other nationalities being Japanese, American, Dutch and German. The latter re-appeared in 1920-21, and 18 German vessels visited the port of Rangoon in 1921-22. The overland trade to China and Siam is relatively small.

Towns. A study of the maps of Burma which appear in Atlases is apt to give one a false idea of the relative importance of the towns. So many have achieved fame and large type on maps by virtue of being the local outpost of the Government (as for example Magwe or Tharrawaddy), whereas really important centres of commerce (like Yenangyaung, the focus of the Burmese oil-fields) almost escape attention.

Rangoon is the third port of British India, and is close on the heels of Bombay. In 1921 the population was roughly 340,000. Its situation on the southernmost spur of the Pegu Yomas gives it command of both the Irrawaddy and the Sittang Valleys. The important teak and rice mills and the oil-refineries of Rangoon should be noted. It is situated 20 miles from the sea on the navigable Rangoon river, and has access to over 1,500 miles of navigable water-way to the north-west. Railway and road communication to the hinterland is facilitated by the dry land at the foot of the Pegu Yomas. With the exception of *Bassein,* which serves the western part of the delta, the greater part of Burma's rice and teak trade passes through Rangoon. *Moulmein,* the first town in British territory in Burma has not gone ahead at the same rate, but still has an extensive rice and teak trade. Mandalay, the last capital of independent Burma, has a steadily decreasing population and the air of decay of a city past its prime. Western enterprise has failed to produce more than a very patch-work renovation. Its population is roughly 140,000. *Prome,* on the Irrawaddy, is an important railhead for transference of traffic from the river to the rail; 120 miles up-stream is *Yenangyaung,* which probably has the second largest white population in Burma. There are few towns of any size in the Shan States, but Burma can boast two hill-stations—Maymyo (3,200 feet) near Mandalay is the Simla of Burma in that it is the summer seat of Government, and Kalaw (4,300) with delightful pine forests in the southern Shan States. *Bhamo,* on the Irrawaddy, and near the Chinese Frontier, controls the land traffic to China; *Nam-tu* is a large mining community in the northern Shan States. *Akyab,* the third port of Burma (rice) is the chief town of the Arakan Coast, as *Tavoy* is of Tenasserim.

X. Some notes on the future possibilities of Burma.

If this article is ever read by a Burman, it must not be thought that the writer has anything but the deepest sympathy for Burma and the Burmans. They are a lovable people, and it is incredible that anyone who has really lived among them and seen them at home can wish them anything but a prosperous future. But western eyes can see the failings as well as the good points, for it is often the on-looker who sees most. The hope of Burma is with the young men who, athirst for knowledge, crowd to its University. Burma, like most of the countries of Europe, has now its tub-thumping politicians, who may become a great danger to the country. First and foremost the Burman must be sure that his countrymen have developed sufficient enterprise and staying power to withstand the Indian or the Chinaman, or even the Jap, anyone of whom may be waiting to step in and wield a sceptre. One cannot help feeling sure that the best type of Burman and the best type of Englishman working side by side will bring out the best in all the country.

With the development of railways and roads, the opening up of the Shan States and the Hills, there are immense possibilities in Burma, some of which have been briefly noted above. Rubber, sugar, cocoa, coffee, tea, coconut, wheat, jute, cinchona (for quinine), opium, cabinet weeds, fruits, cotton, ground-nut, and silk may all be numbered amongst the almost untried possibilities of Burma, and anyone of them may have a great future in store. The mineral resources of many parts are as yet little known, but it is likely that wealth lies not so much in those having a rosy sound—such as gold—as in humbler products such as iron and chromium.

There is a great future possible, but also, is the climate too kind, yet too powerful for white and coloured alike?

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IRISH PLACE NAMES & GEOGRAPHICAL INFLUENCES.

ELENOR BUTLER, M.A.

(*Paper read before the Irish Geographical Association April 30th, 1923.*)

THE subject of Irish Place Names is a bewilderingly complex one. It might be studied under many different aspects, and each branch of the study would itself occupy a goodly volume. There would be "Irish Topography considered with reference to Ancient Irish Mythology"—a volume which would introduce us to the ancient Irish cult of the great forces of nature and trace out for us the impress left by it on the place names of to-day. Or the subject might be approached from the view-point of Early Gaelic Literature; and volumes entitled "The Red Branch Cycle and Irish Place Names," "The Ossianic Cycle and Irish Place Names" would initiate us into the wealth of song and story bound up with the names of Ardee,[1] Creeveroe,[2] Glenosheen,[3] and Derrynaveana.[4] Or, in a volume entitled "Christian Influence on Irish Place Names" some mind versed in the early Christian period of Irish History might evoke for us a vision of those days of ascetic piety, and show us the Colms, the Finians, and the Ciarans in their Island retreats, their *Dyserts*[5] and their *Kills*. Or again, some scholar deep-read in the period of Norse expansion might account to us for the names left from the days of the Norse trading settlements here, and clothe for us with historic interest our Leixlips, our Wicks, our Laxweirs, and our Fiords.[6] Or some student of later history might tell us what a chapter on the Penal Days is written over the face of every ordnance map in the Knockanaffrins and the Glenanaffrins: the Mass hills and the Mass glens.

The poet, the artist, the naturalist, the meteorologist, would also all approach the subject from their several angles; and each would contribute much that would be profoundly interesting. But in proposing to me the title "Irish Place Names and Geographical Influences," the Irish Geographical Association hit upon a phase of the subject which reappears, like the plan of a living organism, through all the other phases. For the Geographical Influences may be said to be permanent. The words describing the geographical features are the main ground-work on which the whole structure of names, adding the human associations, is built up. Also, the geographical forces have been always at work and must have been very strong factors in fostering and in shaping the movements of human thought, and the trend of human events, the memory of which, wrought into the place-names, adds to the bare geography the note of human interest.

Before man appeared on the earth the geographical position and physical features of Ireland were already almost what they are to-day. True, neolithic man might have penetrated hither by a land route from Scotland before Ireland became finally sundered from that country, and man must have entered Great Britain from the Continent also by a land way before the sea had eaten itself a passage out of the easily-dissolved chalk round Dover. But, even so, the Irish area, once a great inland waste with deserts and salt lakes, must have been, from long before the coming of man, what Professor Cole so happily calls an "Outpost"[7] on the edge of the European land-mass. Thither in the early migrations of the Aryan peoples, the most venturesome and the descendants of the most venturesome penetrated. Whatever dwellers occupied the land before them are hidden away in the misty dawn of history.

They have left no traceable impress on the Topography. Their language, or whatever words served them for language, went down before the tongue of these Aryans or became assimilated by it.

The Aryan people who came hither were Celts from the Mid-European plateau. Pressing ever westward in the track of the setting sun, they seem to have separated much later from the Hellenic and Italic peoples than did the other members of the Indo-European stock—Philologists are all at one on this point. We can trace their movements by place names still existent across Europe from the Danube to the sea at Kerry. There is Danube itself, "Dan-ab" (bold river); there are Lyons and Leyden both modernised from "Lugdunon" (Lugh's Fort)—Lugh was the Celtic Sun-God. There are Douro and Adour with the same root "dobhar" (water) which occurs in Bundoran and probably also in Dover. There is Garonne, "Garb-abhainn" (rough river), there are the numerous Avons in Great Britain, and there are our own Avon more, Avon beg, Owenmore, Owenbeg, etc.[7]

According to Dr. Eoin MacNeill this Celtic people must have come to Ireland at the height of the period of Celtic expansion in mid-Europe, that would be about the fourth century before Christ; and he finds sufficient archæological evidence for holding that these Celts were already long skilled in the use of iron before they came hither. Dr. MacNeill cites the evidence of the late Mr. George Coffey, who held that in Ireland the Bronze Age comes down to about 350 B.C., and is succeeded immediately by the Late Celtic Period of the Iron Age. Putting this evidence side by side with what is known of the migratory movements of the Celts on the Continent, Dr. MacNeill comes to the conclusion that the Celts reached Ireland about 350 B.C. or at least not considerably earlier than that date, despite the popular tradition regarding Milesians landing two or three thousand years before the Christian Era.[8]

The knowledge of iron implements must have given to these people an enormous advantage when they came into a land of oaken forests such as Ireland then was, and among a people as yet only skilled in the use of bronze. The iron weapon gave a superiority in warfare and in hunting; but the iron implement, with which to hew and delve, gave a superiority in forest clearing, in bread-winning, and in home-making generally; so we are not surprised to find that the Celtic immigrants quickly become the dominant race in the land.

Now, given the presence of a vigorous people, in the process of expansion and already well-skilled in the use of iron, this land of their adoption was eminently suited by geographic conditions for becoming in their hands the home of a generous and distinctive civilisation; and all the evidence available, especially that drawn from a study of the ancient literature of Ireland, points to the fact that such a civilisation did spring up here and flourish for a prolonged period. It was no mean civilisation which produced the Epic of the Táin, nor was it a shallow or transitory system of thought which so welcomely received the early Christian teaching and so soon produced the glory of sixth and seventh century Ireland. Part of the heritage of that early Gaelic civilisation remains to us in the Gaelic language; and it is to that language that Irish Place Names belong, if we except the few scattered names which remain to us from the period of Norse expansion, and the English names, which are but as a growth of yesterday.

A study of Geographical influences on Irish Place Names, therefore, involves a consideration of the part played by Geographical forces in fostering and determining the nature of that early civilisation. That part was more far-reaching than might appear at first sight.

In the first place, the land to which these Celts came was a land highly favoured by nature. Its position, facing the warm ocean current and the kindly south-west winds, made it then as to-day a land without extremes of temperature, and with an abundance of soft showers. Water, the first essential for permanent human settlement, was nowhere lacking here. Rich grass for pasturage grew spontaneously then as now. Much of what is now bog was then oak forest. To make clearings in this was an easy matter for a people with iron implements at their command. The soil of the clearings was rich and responded generously to any efforts made at cultivation. The forest itself abounded in game (the red deer has not yet died out in our woods); the rivers, lakes, and surrounding sea abounded in fish. In short, as the poet puts it, this Ireland was a "*plenteous place*"; and it is only in such places that a generous civilisation can take root and flourish; for it is only when man has some energy left over after the essential task of finding himself food, shelter, and raiment, that he thinks of devoting himself to the cultivation of the liberal arts.

But it sometimes happens that even a rich country is held back from progress by being constantly drawn upon for defence of frontier: witness the age-long frontier wars between France and Germany: witness the later history of Ireland. But ancient Ireland was not thus drained of her energy and resources in the task of foreign defence. The country was a natural geographical unit, cut off by deep and perilous, if narrow, seas from all other lands. The sea was for her in those days what in an earlier time the desert had been for Egypt—a natural barrier against invasion. Thus those energies and resources of the country, which might otherwise be used up in foreign defence, were left free for the development of the arts.

But Ireland was more favoured than Egypt in that, within the barrier, she had great diversity of conditions: coast, river-valley, open plain, moor, forest, grassy upland, mountain; and several groupings of all these. The dweller here was thus called upon for greater use of his intelligence in adapting himself to his environment than the dweller where life was lived in a monotonous groove; and this demand upon the intelligence, this call for initiative in making the most out of environment is in itself a strong factor making for progress, in the individual and in the community.

Moreover, in Ireland the nature of the country, with its scattered groups of highlands, and with its various river-valleys opening to different seas, precluded the possibility of over-centralisation, which was the bane of Ancient Egypt. Ireland was no place for Pharaohs. Each of the several geographic regions within the land had its own island-studded sea-board, its own deep-sea-inlets, its own great river valleys and its own mountain ridges at the back: each in fact lived its own characteristic life. The very conformation of the country fostered the development of a social organisation composed of several almost autonomous units, of the type rather of the Ancient Greek States. This left free play for the development of the individual and went far towards giving to the early Gaelic Civilisation its distinctive non-cast-iron character.

But where the ancient Greek States had easy access to each other only by the sea, the several regions in Ireland had easy access to each other also over land. The dwellers in any of the sea-facing river valleys had only to penetrate far enough into their own highland boundary to debouch on a valley opening towards the *Machaire Mor* or Great Plain. The Central Plain formed the natural highway between the several geographic regions. Tara, the natural capital of the country, was situated on an eminence in its midst. And to Tara all roads led. There the triennial *Feis* assembled, which brought together kings, druids, bards, brehons, craftsmen, and traders from all parts of the country. This ease of intercourse between any one part of the island and the other parts, through what was the natural all-Ireland assembling place, had the effect of joining up the peoples of the almost autonomous geographic regions into an organic whole. Each province boasted its king, but the high-king at Tara held some sway over all. Whatever the local differences, and whatever the wars for tribute between the peoples of the different regions, the whole island had a common language, a common literature, and a code of laws in common.

The language and literature, which were the finest flowering of the Gaelic civilisation of those days, are perpetuated over the face of the country to this day in the Gaelic place names, the habitat of which extends from sea to sea. The subjoined collection of Irish words for geographic features, though not by any means exhaustive, gives the key to a good half of the place names of the country. For the other half we shall have to seek the origin in later history, chiefly in the Early Christian Period.

The great wave of monasticism which followed upon the receiving of the Gospel has left its impress far and wide on the place names, not alone in the occurence of the words *Cill, Diseart,* and *Clochar,* but in the occurence of the names of the great evangelisers—Patrick, Finian, Colman, etc. In a thousand cases the word for the geographical feature, or else the word Kil (*Cill*) gives half the name, and the historical association of this time, the other half. Croagh Patrick, Slieve Donard and Kilcolman are cases in point.

But history can never quite free itself from geography. The manner in which Christianity was received in Ireland must have depended to some appreciable extent on the nature of the ancient Gaelic Civilisation which preceded it, and that in its turn owed much to geographic conditions. A civilisation, in whose literature figured a Fergus who could not break his word "because the truth within his heart would not let him"; and Fianna, of whom the crowning virtues were "strength in their arms, truth on their lips, and cleanness in their hearts," was surely a soil in which the Gospel seed bade fair to bring forth a beautiful and vigorous growth.

Geography had much to say also in determining the course of later history. In the days of the vigorous Scandinavian expansion which drove Northmen into all the seas from the Baltic right round to the Mediterranean, rich Ireland, lying on the highway between Scandinavia and Gibraltar on the one hand, and between Scandinavia and the French ports on the other, inevitably became the victim of Viking vandalism. The sea, which these daring sea-rovers had made their sporting-ground, now no longer served as a barrier. Robbed of her time-long bulwark, Ireland might well have become an outlying kingdom of Scandinavia, as England did for a time, were it not for the unifying influence of the Central Plain, which permitted of the great all-Ireland rally that broke the Northmen's grip on Ireland on the day of Clontarf. Neither, of course, could the big rally have been possible but for the greatness of soul of the man, Malachy, who for Ireland's sake suffered the usurping Brian to hold the High-Kingship. The human factor must be borne well in mind; but, all the same, the fact that the Central Plain was in Irish, not Scandinavian hands, was of high import in determining the final issue of the struggle. After Clontarf the Northmen seem to have confined themselves to their coast cities, Dublin, Waterford, Limerick, etc., which they themselves had built and which they now retained as trading stations. Stanford's Map of "Scandinavian Trade Routes," reproduced in Mrs. Greene's "Old Irish World," shows how the Norse sea routes passed, one down the East coast of Ireland to Waterford and then to Brest, and another down the west coast to the Loire and Gironde estuaries and to Gibraltar. The Scandinavian Place Names in Ireland remain from the days of these trading settlements. They are few—not a score in all, against upwards of one thousand five hundred Scandinavian names in North and Middle England. Such as they are, they occur only along the great sea-trade-routes or up river mouths which opened on these. Strangford, Carlingford (half-Irish), Howth, Ireland's Eye, Leixlip, Wicklow, Wexford, Waterford, Helvick, Smerwick, two Mizen-heads and Lax-weir almost exhaust the list, and a glance at the map will show that these places lay on the highways between Trondhjem and the western parts of France and between Trondhjem and the Mediterranean.

"Abbeys," "Castles" and "Granges"—and their number is not great—are almost all that remain in our toponomy from the days of the next-comers, the Normans. Many of the Normans with their retainers came direct from France, and they naturally established themselves in the rich river valleys of the South which opened towards their own land. Barrow, Suir and Blackwater saw Geraldine Castles arise, and Nore saw the rise of the house of Ormond. Strongbow, the Welshman, drove the Danes out of Dublin and there for a time ruled as King of Leinster. His name still survives in the *Pembroke* district, South Dublin.

But Norman influence became merged in, and prepared the way for English influence, the greatest force against which the Gaelic Place Names have had to contend. This time again geographical influences were at work. The sea being now no longer a barrier, the forces of the country were used up in defence; the foundations of the native civilisation were thus weakened, and its natural evolution arrested. The great plain, which in the old time had made Ireland one, and which later had, with its centralising influence, helped to save her from becoming a Scandinavian Kingdom, became, with the occupation of the Pale by the English, as a wedge to cleave the several regions apart. And the occupation of the Pale by England was due as much to geographic as to strategetic causes. From Dublin to Dundalk there is no mountain hinterland, as elsewhere along the Irish coast. This rich coastal plain opens to the Cheshire Plain in England, through which has lain the great highway from London, from Roman days till now. Already the Danes in the days of their power had established a line of trade communication from Dublin to the Lancashire Plain and through York to Novgorod. The way was open. Had there been a mountain range from Dublin to Dundalk, history would have been written differently. As it was, this wedge of English occupation clove the Irish apart. Historians may talk about disunion at their will, but the several geographic regions, now no longer joined up by the Central Plain, had little chance of concerted action. The rest is common-place. But what is not common-place is the extraordinary tenacity with which the Irish Place Names have held their ground, despite all the waves of British influence which have washed over the country in seven centuries. Cork, Limerick, Galway, Derry, Belfast even; Dundalk, Drogheda, Trim, Navan and Kells right in the Central Plain; Coombe in the heart of trading Dublin; Terenure, Rathmines, Clonskea, and Rathfarnham, on its most English outskirts, all retain their Gaelic garb. As a rule the names of the old towns and of nearly all the townlands have remained Irish. But new settlements, if the settlers were English, naturally received and retained English names. The planting of Leix and Offally in the reign of the English Queen Mary, after the virtual extermination of the Irish there, accounted for the names Queen's County and King's County, Maryboro' and Philipstown. Yet, after weathering almost four centuries, these names have again given way to the old Irish ones, just as an exotic plant is eventually crushed out by the indigenous flora. In Ulster, where the plantations were most successful, the Gaelic place names have remained almost everywhere; for these plantations were largely of Scotch Presbyterians; and for these immigrant Scots of a few centuries ago Gaelic was still a mother tongue. They had no need to alter the name or to corrupt it, as had the English settlers, for whom this whole rich mass of Irish toponomy was so much unpronounceable and inunderstandable jargon. A statute of Charles II declares that "His Majestie taking notice of the barbarous and uncouth names which hath occasioned much damage to divers of his good subjects" orders "comelie and reasonable English names" to be invented.[9] When "His Majestie's good subjects" set about to do their Sovereign's bidding, or, what is more likely, set about to suit their own convenience, they sometimes invented bona-fide English names, e.g., Newtown, Fairview, etc.; sometimes they added an English ending to half the Irish name, e.g., Booterstown, Cellbridge; or sometimes again they corrupted the Irish word to an English one which seemed to sound like it, as when *"Fearna"* (meaning Elder-trees) became with them *"Ferns."* Often the new names were indeed comely, as for example "Woodlawn"; sometimes they were eminently reasonable, like "Five-Mile-Town," "Six-Mile-Bridge"; but sometimes again they were neither comely nor reasonable, as when the little village near the caves a few miles south of Blarney in the Co. Cork, called in Irish "Uamhna," i.e., Caves, became in English "Ovens."

Regarding the names due to English influence, be they "comely" or uncomely, "reasonable" or unreasonable; be they bona-fide English, hybrid English or corruptions from the Irish; one great generalisation—and that a geographical one—will be found to hold good almost everywhere:— *"English Place Names rarely occur above the* 300 *feet contour line."* Their habitat is on the plains and in the rich river valleys. The reason is obvious.

But ever and again the native Irish influence travels back from its natural strongholds, the highland regions. Our day has seen Kingstown and other English names make way again for the Gaelic names which preceded them; so Ireland bids fair to end where she began with a characteristic Irish nomenclature extending from sea to sea.

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[1] Ath Fhirdia—Ferdia's Ford, scene of the three days' single combat between Cuchulainn and his boy-hood's friend, Ferdia, in the Epic of the Tain.

[2] Craobh-Rua—Red Branch.

[3] Gleann Oisin—Osheen's Glen.

[4] Doire na bh-Fianna—Oak Wood of the Fianna.

[5] For an explanation of the Dysert v. "Dysert Diarmada" (M. H. Gill & Son).

[6] In Strangford, Carlingford, Wexford, Waterford, the "*Ford*" ending stands for the *fiord* of the Norsemen.

[7] The surprising nearness of some Gaelic root-words to those of the bed-rock Sanskrit is instanced in the Hindoo place names "Punjab"—Five Rivers, and "Do-ab"—Two Rivers.

[8] Dr. Eoin MacNeill—Phases of Irish History, Chapter II.

[9] Quoted in Dysert-Diarmada, p. 104.

APPENDIX.

IRISH ROOT WORDS COMMON IN PLACE NAMES.

LAND FEATURES.

Root Word	Examples.
Sliabh = Mountain	Sliabh an Iarainn (Slieve Anierin) i.e. Iron Mountain.
Cnoc = Hill	Cnoc Fírinne (Knockfierna) = Hill of Truth. Cnoc Leithid (Knocklayd) = Hill of Width.
Beann = Peak	Beann Gabhar (Bengore) = Goats' Peak.
Cruach = Stack	Cruach Phádruig (Croagh Patrick).
Cruachán = Little Stack	Cruachán (Croghan).
Mullach = Summit	Mullach an Radhairc (Mullaghareirk) i.e. View Summit.
Maol = Bald Summit	Maol-Reidh (Muilrea) = Flat Bald Summit.
Ceann = Head	Ceann Córa (Kincora) = Weir head.
Cinn = Heads	Cinn Mhara (Kinvarra) = Sea-heads.
Druim = Ridge	Aon druim (Antrim) = Single Ridge.
Tulach = Hill	An Tulach Mhór (Tullamore).
Bearna = Gap	Bearna (Barnagh).
Bearnach = Gapped	Sliabh Bearnach (Slieve Bernagh).
Ros = Headland	Ros Mór (Rossmore).
Ring = Point	An Rinn (Ring).
Béal = Mouth	Béal Feirsde (Belfast) = Sand-bank mouth.
Carraig = Rock	Carraig na Siuire (Carrick-on-Suir).
Cloch = Stone	An Chloch Mhór (Cloughmore).
Cluain = Meadow-land	Cluain Meala (Clonmel) = Honey Meadow.
Cabra Cabrach } = Unprofitable ground.	Cabra,
Currach = Marsh	An Currach (The Curragh).
Moin = Bog	Móin Árd (Monard) = High Bog.
Na Móna = Of the Bog	Baile na móna (Ballinamona).
Coill = Wood	Barr na Coille (Barnaculla) = top of the wood.
Eiscir = Esker	Eiscir (Esker).
Machaire = Plain	Machaire Rátha (Maghera). The plain of the fortress.
Magh = Plain	Magh Ealla (Mallow) Alloa's Plain.
Uamha = Cave	Muileann na h-Uamhan (Mullinahone) = Cave Mill
Gleann = Glen	Gleann na Smól (Glenasmole) = Thrushes' Glen.
Cúm = a Hollow	An Cúm (The Coombe).
Inis = Island	Inis-Fraoich (Innis free) = Heather Island.
Tír = Land	Tír an Iubhair (Terenure) = Land of the Yew-tree

IRISH ROOT WORDS—FOR WATER FEATURES.

Muir Saile	= The Sea	Kenmare Kinsale	Tobar Tiobraid Uaran	= Spring	Tubbermore Tipperary Oranmore
Abh Abhainn	= River	Awbeg Avonmore, etc.	Eas	= Waterfall	Doonass Assaroe
Dobhar	= Water	Bundoran.			
Loch	= Lake Sea Islet				

NAMES OF TREES WHICH OCCUR IN PLACE NAMES.

Dair	= Oak	Kildare, Adare	Eo	= Yew	Mayo = Yew Plain Youghal = Yew Wood
Doire*	= Oakwood	Derry Ballinderry	Iubhar	= Yew	Terenure
Cuileann	= Holly	Cullen Moy Cullen Glen Cullen	Beith gen. Beithe	= Birch	Ballaghbehy
Fearn pl. Fearna	= Elder	Ferns	Ubhall pl. Ubhla	= Apple	Oola Ballyhooley
Trom gen. Truim	= ,,	Trim	Saileach	= Willow	Clonsilla Parknasilla
Leamhan	= Elm	Laune			

*The ordinary word for Wood or Forest is "Coill" e.g. Coill Mhôr (Kylemore) etc.

WORKS OF MAN.

Lios Dún Daingean Ráth	= Fort	Lismore Dunmore Dangan, Dingle Rathdown.	Clochar Manistir Diseart lit. desert place	= Monastery.	Clogher Monasterevin Dysert
Raithin	= Little Fort	Raheen	Cill Teampoll Eaglais Domhnach lit. Sunday	Church	Shankill = Old Church Templemore Aglish Donnybrook = Broc's Church
Caiseal	= Stone enclosure	Cashel	Ath	= Ford	Abascra = Esker Ford
Cathair	= City	Cahir	Droichead	= Bridge	Drogheda = Ford Bridge
Baile	= Town Place Homestead	Occurs in over 6,000 place names	Cora	= Weir	Kincora = Weir head
Gráig	= Village	Graigue	Carn	= Cairn	Carnlee = Grey Cairn
Muileann	= Mill	Mullinahone			
Gort Paire	= Field	Gort Parknasilla			

THE LOWER EIFEL VOLCANIC REGION.

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THE area selected for consideration is one of the most interesting and instructive in the whole of the Rhenish Schiefergebirges, of which it is a part. The morphological features of this mass have been discussed in detail by Philippson[1] and others, but a brief resumé of the essentials of the Eifel structure is necessary as an introduction to the details of the volcanic zone.

The Eifel forms the north-west portion of the Rhenish Schiefergebirges. At the close of Carboniferous time the Devonian sediments in this region were involved in the Armorican and Variscan upheavals, and folded strongly in a S.W.—N.E. direction.[2] Minor submergences occurred later, e.g., in Triassic and Cretaceous times, but denudation was gradually exposing the stumps of the folds, and tending to reduce the whole to the condition of a peneplain. It appears probable that further, but less instense, folding and uplift took place along the lines of the older flexures in late Oligocene and Miocene times, as an effect of crustal pressures, induced by the ridging up of the Alpine masses. The scenery of the Eifel-Westerwald mass is not so monotonous as that of the Hunsruck-Taunus, chiefly by reason of the relics of volcanic activity that provide a rich and varied collection of land forms. The huge vault of the plateau is broken through by igneous rocks in several centres, forming part of the same belt as the intrusions of the Cevennes, Saxony and Bohemia.[3] Two periods of activity may be recognised. The earlier dates from Miocene, the later from post-Pliocene time. During both periods lavas and tuffs were ejected, but of the earlier little is left but denuded ruins, and these are frequently obscured by the products of the later eruptions. Evidences of these exist in a remarkable state of preservation, craters, ash cones, lava flows, tuff beds and maars; while in many places mineral springs and carbon dioxide emanations prove that activity, although weak, has not yet expired.

The Lower Eifel volcanic zone is situated on the foreland that fronts the Bonn-Andernach gorge, descending on the south-east to the Neuwied Basin, a feature produced by local faulting during the Tertiary epoch. It is limited N. and S. by the valleys of the Brohl and Moselle, tributaries of the Rhine. Across the Rhine, on the Westerwald foreland, is an extension of the zone, the forest-covered summits of the Siebengebirge (Ger :siepen—to seep), or Water Mountains. In this region, the products of activity differ in many ways from those characteristic of the main mass. Lava streams are absent, and the scenery is the result of resistant trachytic and basaltic masses rising from a bedwork of loose tuffs. Seamed with tuff and trachyte quarries that have supplied so much of the building stone of the district, and with the south and west slopes closely terraced with vineyards, this area merits individual treatment. With its numerous legends, immortalised by Heine, and its associations with Goethe and Beethoven, it helps to confer on the Rhine a dignity that makes it more than a mere geographical term, and brings the realisation that, to the people, it is an integral feature of their national life, as much by reason of its associations as by its economic value. Since, however, this is beyond the scope of the present brief paper, the Siebengebirge extension will not be further considered.

The principal area is best approached by the Brohl valley from Brohl, or by the Nette valley from Andernach. Whichever route be followed, it is soon evident that a very definite subdivision of the region may be made, according to the nature and appearance of the volcanic products. Four separate masses are recognisable, viz:—

1. The Southern, or Nette valley mass,
2. The Central, or Laacher mass,
3. The Eastern, or Gänsehals mass,
4. The Northern, or Brohl valley mass.

The general level of the Pliocene plateau, from which the accumulations rise, is a little more than 800 feet above sea-level, while the greatest cones attain heights of more than 2,000 feet. The Nette valley mass comprises two distinct groups, the Maifield and the Pellenz. The former is a crescent-shaped elevation built up by four volcanoes. Eastward between the horns lies Ettringen, backed by some of the mightiest volcanoes of the whole region. Their one-time power may be gauged by an examination of the many basalt lava quarries in the vicinity. About six miles eastward, rising abruptly from the intervening plain, lie the cones of the Pellenz group. These, through which the Nette breaks, have suffered severely from denudation and are comparatively insignificant. Their importance is further minimised by the fact that they rise from the Neuwied Basin.

The Maifeld group poured out lava streams Rhinewards, and the working of these for basalt is the most important local industry. Wherever accessible, the flows have been opened up, and the triangular area between Ettringen, Thur and Mayen is a maze of quarries and stoneworks. The Nette valley is one of the greatest volcanic stone workings in the world, and the industry dates from prehistoric times. The Romans, in particular, transported material to the lowlands for defensive constructions,[4] while the Rhineland castles, churches and town walls, even as far east as Danzig, testify to the value set upon the stone in the Middle Ages. To-day, the Eifel villages are built largely of the basalt. In the E. Eifel particularly are relics of a curious use of the stone—wayside crosses of basalt, bearing 17th century dates, indicative of the reawakening of religious feeling that inspired the region at the end of the long drawn out wars.

Stone of decided hardness and porosity and free from enclosures is used for millstones—this is the oldest and still the most profitable manufacture; wall stones, paving stones, road setts, steps, tombstones, wharfstones, railway platforms, these are but a few of the other products. A little more than a mile N.E. of the Mayen quarrying centre lies that of Niedermendig. Here, the lava flows lie buried beneath a thick layer of volcanic ash, erupted at a later stage by the Laacher group. A different system of working the stone is necessary, and the landscape is dotted with shafts up which the stone is hoisted by various methods, ranging from the horse-propelled windlass to the electric crane. Niedermendig, like most of the larger villages in this region, supplements the stone quarrying with other industries based upon the volcanic products, e.g., the manufacture of carbonic acid, mineral waters and beer.

The Laacher Mass is conveniently approached from Niedermendig, by way of the Wingertsberg slopes, through typical tuffland scenery. Numerous low undulations of loosely compacted volcanic ash stretch on either hand. Only the lower plant forms are able to thrive, and the monotony is but slightly relieved by the clusters of shrubs that fill the hollows. A gentle incline culminates in the ring of forested heights that surrounds the largest maar in the Eifel—the Laacher See or Lake of Laach. The bed of the lake was created by two explosions, and can hardly be said to represent a truncated crater. More probably, the explosions destroyed several small cones and the ring of heights encircling the lake comprises part of the material ejected by the outbursts. No lava flows occurred, but the ejecta are mainly loose ashes and tuffs containing fragments of the country rock—Devonian slates, blocks of lava torn from pre-existing streams and other fragmentary igneous material from the depths of the disturbed zone.

The lake is oval in form, with the longest axis running N.E.—S.W. for nearly a mile and three-quarters. The narrowest width coincides with a central constriction marked on either side by a jutting spur of high ground. Soundings have revealed a submarine ridge connecting the spurs; on either side of the ridge the depth increases to a miximum of 200 feet. This is fairly definite evidence of two distinct eruptions, and the arrangement of neighbouring deposits confirms this view. The southern side is bordered with deposits of coarse pumice-like ash and a finer variety known as trass, while fine-grained grey tuffs surround the northern half. Wherever overlapping occurs, the tuffs are always uppermost lying with noticeable unconformity. It may be concluded that the site of the lake is formed by two craters slightly overlapping, the southern being the older. Sufficient time elapsed, before the opening of the northern crater, for weathering agencies to attack the pumice and trass. Such funnels of explosion as these are characteristic of the later stages of volcanic activity, and the frequent occurrence of shattered masses of lava and deep-seated types of rock in the beds of pumice indicates paroxysmal eruptions, that blew out the plugs of existing volcanoes, comminuted the surrounding rock masses, and produced vast quantities of volcanic dust. The pumice is distributed south and east over the Neuwied Basin as far as the Rhine and the Moselle, frequently to a depth of over 30 feet, while the finer trass has extended in every direction and fills the valleys, particularly the northern, e.g., that of the Brohl, to a depth of 150-200 feet. Belts of fine dark ash are very noticeable in sections of the pumice. These mark periods of diminished activity, when only ash was thrown out. The abundance of pumice in the Neuwied Basin has originated a peculiar industry—the manufacture of 'schwemmstein' (lit. alluvial stone), a mixture of ground pumice and poor chalk, cut into blocks a little larger than ordinary bricks. It is greatly valued for its lightness. Needing strong but small foundations it enables rapid building, and is in great demand throughout Central Europe. Comparatively a young industry (1845) the output reaches 400 million blocks per annum, and the plain on the left bank of the Rhine from Coblenz to Andernach is marked by innumerable 'schwemmstein' yards. Mixed with sand and cement, the pumice forms a durable yet light material, highly valuable in constructional work, e.g., bridges, platforms and pavements.

The 'Trass' is the basis of an industry in the Brohl valley, and is best considered later.

Westward of the Lake of Laach, the country rises rapidly to a wall-like range, that represents the greatest activities of the volcanic disturbances. This, the Gansehals mass, is the divide between the head-streams of the Nette and the Brohl, and consists, for the most part, of stratified tuffs, in which are embedded numerous volcanic bombs of all sizes. The landscape is one of soft, rolling heaths, crowned by towering cones, the whole falling gradually northwards to the Pliocene plateau with its sandy clays and poor lignites of peat derivation. The old craters are mostly breached by lava flows, while the reddish tinge of many of the tuffs hints at fumarole action.

Here again, two varieties of tuff are distinguishable. A coarse variety with fragments of country rock, e.g., slates, and dyke rocks, e.g., syenite, seems to belong to the earlier stages of eruption, and the prevalence southwards of this type is very marked. The finer and later variety is most thickly deposited in the northern half of the area, and apparently owes its drift in this direction to the prevailing winds at the time of eruption.

The ridge falls steeply to the basins of Rieden and Weibern, where the loose tuffs are consolidated with a matrix of calcite, forming a yellowish kind of rock of the consistency of freestone, closely resembling, in appearance and usefulness, Bath stone. Traces of Roman workings in the Weibern basin are very common, and throughout historic time the varieties of tuffstone from this district have been greatly prized for architectural creations involving figurative carving and design. The Weibern basin is still the centre of the industry, and as a rule the stone is quarried in open workings, finished on the spot, and sent to the Rhine for distribution, transport being facilitated by the Weibern gap—a striking col separating the sources of the Nette and Brohl, rendered more remarkable by the huge cones that guard it on either side.

The Brohl valley mass may be approached by way of the Weibern gap, or, more conveniently, from the northern shores of the Lake of Laach through an opening in the surrounding rampart. The path runs by the reed-bordered edge of the water, leaving it only to avoid occasional flats, clothed with the hardy birch which alone can bear the cold induced by the depth of water, then rising slowly through beech woods that in turn give place to pines, spruce and larches, breaking at last into the higher and barer slopes of the Brohl valley. Here, on the ash-strewn Pliocene peneplain, lie wind-swept villages that remind one of the north Devon plateau. Meagrely sheltered, and constructed either of the local lavas or compacted ash, the intensively cultivated surroundings fail to remove the impression of wild isolation produced by such villages as Wehr and Wassenach. But the scene changes quickly. Unexpectedly one is confronted with examples of those deep narrow valleys so characteristic in areas of Devonian rock, and the Brohl valley, with the crowded river, road and railway, is an excellent example of the type. From loess covered ledges, the sides of the valley drop precipitously for 250 feet near Burgbrohl. After the first 100 feet, the slope is broken by a series of artificial terraces cut into a curious yellowish rock that, in appearance and vertical erosion forms, is strongly reminiscent of loess. The resemblance is accentuated by the storehouses and shelters that have been cut in it. This is the 'Trass' that fills the valley to depths varying from 130 to 200 feet, and is in every way more important than the cones and ash beds that border the higher slopes of the valley. In composition it is a volcanic ash, hardened by hydrochemical action, and may be traced up the Gleeser and Tonnissteiner, tributaries of the Brohl, to the Laacher mass. The Nette valley, near its junction with the Rhine, is overlaid with trass, but the deposits are thinner and of less importance.

Erosion, aided by human attacks, has removed the greater proportion of the Brohl valley deposits, although in some places the stream has not yet succeeded in cutting down to the original bed, while the lateral work is by no means completed. When undisturbed by quarrying, the trass is wooded on its higher slopes, oak, birch and fir being the most common types. On the lower slopes coarse grasses and crosswort gradually give way to boggy types of plants, e.g., valerian and hemp-agrimony, in the valley flats.

From Burgbrohl to Brohl the valley is a hive of industry. Stone and cement works mingle with chemical factories, the latter drawing upon the supplies of carbonic acid that are tapped by deep borings. Once again there are ample proofs that the value of the trass was recognised by Roman architects (who even appreciated its property of hardening under water when mixed with sand and lime), and that its importance had in no way diminished during the Middle Ages. At the present day it finds little application as a building stone alone, but it is in great demand for piers, docks and other workings of an allied nature by reason of the property already mentioned. The present century has seen a very rapid growth, the output in 1912 (200,000 tons), being twice as great as that in 1902.[5] The ease with which it is cut and the ready transport facilities combine to make the quarrying a profitable industry.

The thermal springs are laden principally with dissolved carbon dioxide, which is the basis of such local manufactures as mineral waters, white lead and the bicarbonates of potash and soda. Large quantities of the gas are stored under pressure in cylinders and exported to other centres. Mofettes, or exhalations of carbon dioxide, are frequent but unimportant as practical sources of supply. The utilisation of the springs is not confined to the villages of the Brohl mass, though it is most active there, and is capable of great expansion. Small spas exist, of local importance only; all the conditions are against the growth of curative centres.

It might be expected that where Man's assaults have been so prolonged and varied there would be little of Nature's stronghold left unbreached. But one may still wander far from the sight of human action among cones, craters and maars, whose history is still plainly written. There are problems in plenty for the physical geographer; of these little has been said. They have been indicated by many able pens,[6] and must, in any case, be studied on the spot.

In spite of the small area, climatic conditions are very diverse owing to the variety of relief. The temperature of the valleys ranges from an average of 65 F. in July to 36 F. in January; the annual mean is about 50 F. in the valleys but slightly lower on the plateau, the actual difference depending on the nature of the exposure.

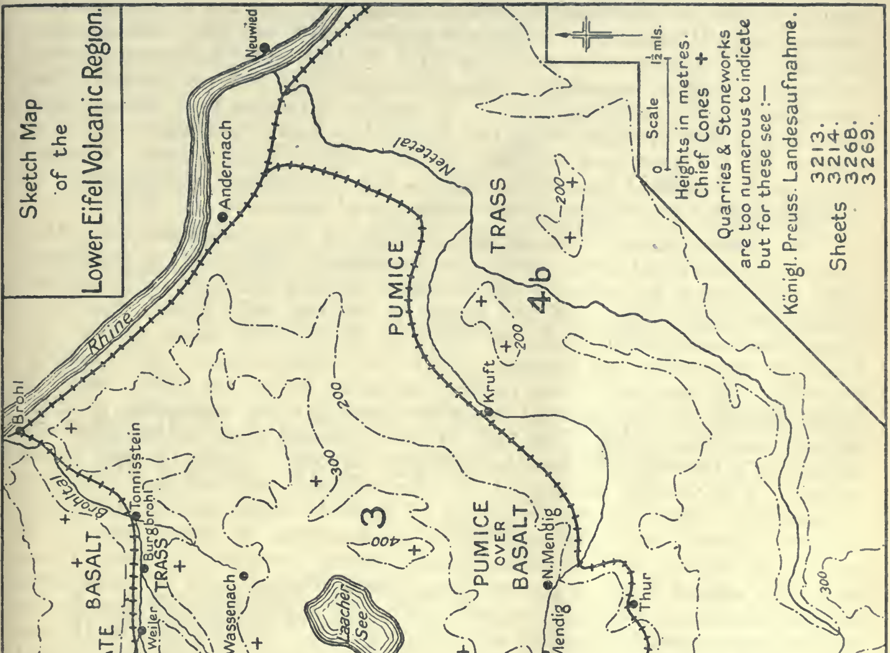
Rainfall is not affected to the same extent by the irregularities of relief, for many of the valleys run with the prevailing wind. Fairly even in distribution, the annual fall averages only 636 mms., as compared with 932 mms, on the Venn Plateau, and 679 mms. over the whole Eifel. Yet floods are not uncommon in the valleys, since they are too narrow to accommodate the heavy discharge from the impermeable plateau surface. In the winter season, heavy snowfalls are the rule and communication is considerably restricted. Houses built in exposed sites are specially adapted to withstand these severe conditions. The roofs are steeply inclined and the eaves reach within a few feet of the ground, after the fashion of certain Swiss types. In addition, they may be protected from driving snow by thick beech hedges.

Late frosts are frequent everywhere, so that many species of plants are restricted to the lower valleys and basins. This is the case with fruit trees and vines. Thus, the limit of cultivation of the latter in the Ahr valley is Honningen, while in the steeper Brohl they do not thrive above Ober Zissen. Obvious changes in the nature of the plant growths bear witness to the severity on the plateau, though the diversity of the soil is a complicating factor that must be given due attention, for cold and marshy clays give way to heavily wooded lavas, which are replaced in turn by rye-bearing Devonian slates, and so on.

The present state of land utilisation cannot be understood without some brief reference to its growth in the past. It is so intimately entwined with the history of human settlement, that one of the most instructive lines of approach is by a study of the distribution of place-names. This avenue has been adequately explored by German workers,[7] and is beyond the scope of the present paper. In Germanic early times, as described by Caesar and Tacitus, communal practices with regard to land were the rule. The tribe allotted land to its constituent clans and households for a temporary occupation. These were ploughed up and cultivated for a few years, and then allowed to lie fallow for a long period; a kind of agricultural economy very suited to a region where land was plentiful and people few. But it followed that existence was semi-nomadic in character, and the tribes were brought into close contact with Celtic influences. These, aided by the example of Roman culture, led to the development of class distinctions. Tribal communities soon became village communities with an agrarian organisation based on the open-field system; an advance that was hastened by the efforts of the Romans to force a settled life upon the tribes. The allotment of a strip of land,—the 'hufe'—carried with it the right to use other community possessions, e.g., pasture, woodland, fishing and hunting. Until the eighth century agriculture made little progress and was subordinated to the rearing of cattle, sheep, swine and goats. To the Benedictines must be ascribed the credit for the rapid advance that then resulted. By their example and teaching in the monastic gardens they initiated a movement towards better and more scientific cultivation. Greater attention was paid to crop rotation, and less to the old method of "brennenkultur," but the latter persisted beyond the reach of the abbeys, and may still be studied in the remote districts of the Eifel. Where practised, it involves the clearing of the thicketed wasteland by burning, the ashes being ploughed in as manure for the land thus prepared Rye is grown for the first year, and is succeeded in the second by oats, after which the land is allowed to rest for fifteen to twenty years. It is a type of "robber economy" similar to that followed by the early peoples in their movement valleywards, and which, to-day, is strongly discouraged by the State.

If the peculiar conditions of geographic environment in the Eifel are borne in mind, it becomes evident that, with increase in numbers, the population was soon faced by the difficulty of obtaining sufficient means of subsistence. The limitations of the land were overcome by an application of the principle so characteristic of German development, that of association (genossenschaftwesen). Side by side with the political community in the villages there arose private communities (gehöferschaften), possessing in common lands of large extent.[8] Holdings in these were assigned to the members at regular intervals, and each community controlled, by a very complex organisation, the systems of drainage, irrigation, field-approaches and crop-rotations in its area. These associations persisted far into the nineteenth century, until when complete private property in land was not recognised. German opinion lays strong emphasis on the importance of this and other forms of communal routine, proudly recounting the struggle of the peasantry to preserve the prerogatives of custom.[9] So, to-day, life in the volcanic area is centred in a compact village nucleus, constructed with no apparent plan and surrounded by open fields where space permits. Communal extents of rough land for pasturage and copseland for provision of beansticks and fuel are not uncommon but, as might be expected, are usually situated some distance from the village. No doubt, the late growth of town life in Germany was partially responsible for the persistence of old routine, but in this region the influence of the Church has been a strong factor, while the growth of transport with the accompanying spread of agricultural improvements has not proceeded so rapidly. The improvement in communication that commenced in the forties brought many from the Eifel to swell the flood of migrants to the towns, though the movement was not so intense from the volcanic region, for the rise of industry brought a new era of prosperity to its many quarries.

Within recent years the penetration of the plateau by co-operative supply societies has tended to remove another example of the highland influence. Until their arrival shops were unknown. Each village had its tiny store, and this was supplemented by annual visits paid by wandering families of hawkers, who, with the approach of spring, moved from their homes in the High Eifel in caravans laden with pottery, tinware and baskets, wandering far and wide until the autumn bade them return to spend the long winter fashioning fresh stock. Their numbers are steadily declining, and permanent removal tends to replace these periodic migrations.



The distribution of modern settlement presents some interesting features, though in a short sketch reference must be confined to the more striking. Isolated dwellings are rare, the characteristic unit being the village. As water and building materials are obtainable everywhere, shelter and easy communication have dominated the choice of sites. The villages may be divided into two classes, namely, those of the plateau and those of the valleys. The former, few in number, are arranged to take advantage of local shelter and often lie in the beds of dried maars, as in the case of Wehr, where the fertile alluvium is an additional asset. The latter may be further subdivided according to the exact situation in the valley. There are those which lie at valley confluences, as Burgbrohl and Tonnisstein, and others placed near the head of valleys where they open out to the Pliocene plateau, e.g., Wassenach. The result is that each of the small valleys contains two villages of a complementary nature, the higher supplying foodstuffs to the lower, which, through lack of room and pressure of other interests, is rarely self-supporting. It must be admitted that this arrangement is not very pronounced in the Nettetal, where conditions are complicated by the structural accident of the highly industrialised Neuwied basin, by a wealth of pumice permitting the widespread development of 'schwemmstein' yards, and by the readiness of access to the Rhine.

The Brohl valley differs strikingly from its near neighbour, the Ahr. The latter, barren of stone wealth, relies upon its vineyards, so settlement hugs the sunny slope, whereas the former, with little vine culture, is studded with right-bank villages for two reasons. In the first place, the main stream has been pushed across the valley by the superior inflow on the right bank, leaving there the greatest width of alluvial tract for building. Secondly, the deposits of trass lie thickest on the left of the valley, which is therefore kept free for quarries and other workings. In so narrow a valley, railway and road swing from side to side, crossing and re-crossing the stream in a manner that recalls conditions in some of the South Wales valleys. The villages are placed on the alluvial fans of the tributary streams and expand along the edges of both the main and the subsidiary valleys. Houses are constructed with the materials at hand and it is possible to fix roughly the limits of the various outcrops of basalt, trass, etc., by a careful study of the building stones. Occasionally one sees older houses built of a compacted volcanic ash supported by a timber framework, the structure approximating in appearance to the 'cob' erections of Devonshire. Most of the village houses have outbuildings, occupied in normal times by a cow or a pig or both. As to crops, the smallholding may produce some or all of the following:—rye, oats, potatoes, cabbage, beans, a type of mangel (knollenkraut), and barley; rye, to give bread and straw for bedding and tying up the vines, oats and knollenkraut for the animals, potatoes for man and animals, cabbage and beans to eke out the bacon supply, and barley for brewing. Sheep, if kept, are turned out in the heaths when these are uncovered by snow, for the fertile land is too precious for fodder crops. The thermal springs have laid the foundations not only of mineral water factories but also of large breweries, whose operations have been assisted by the unrivalled conditions of storage in the galleries of the disused quarries. But all such industries are overshadowed by that of stoneworking. The scores of quarries and shafts and brickworks figured on the maps arrest the eye, but fail to convey an adequate impression of the extent to which the region is indebted to its rock formations.

In spite of the comparative severity of the struggle for existence, the spirit of the people is not, as one would expect, dour and unemotional. The volcanic region has always had two alternatives. If the soil could not be cultivated there remained the possibility of quarrying it even more profitably. Allowance, too, must be made for the infusion of French blood and the strength of Gallic influences which account for the easy-going, lighthearted and tolerant outlook. No better proof of this is needed than the present attitude of the people towards the French occupation. Passive resistance, never so determined as in the Ruhr, is offered with decreasing intensity, and there is an undercurrent of feeling in favour of accepting present conditions (August, 1923), that is quite unknown in those regions near at hand, yet deriving their traditions and culture from different sources.

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REPORT OF AN EXCURSION ARRANGED DURING THE SPRING MEETINGS, 1923.

H. A. Hinton, M.A.

IN connection with the meeting of the Council of the Geographical Association in Shrewsbury in March an excursion was arranged with the object of visiting the Roman city of Uriconium (Wroxeter), to observe as many of the characteristic features of the portion of the Severn Valley as possible in the time available.

At Uriconium the party was received by Mr. Jackson, the resident Curator, who showed the members the excavations at present exposed, and explained the general arrangement of the town as shown by the excavations made up to the present time. Most of the land on which the remains are found being good agricultural land, is only leased from its owner, and is to be restored to its original condition after the results of the excavations have been recorded and objects of interest removed to the temporary building serving as a museum.

Until about 1859 the only indication of the buried city was a massive wall some 20 feet high, which formed part of the Roman basilica, and attention was first drawn to the probable existence of further remains by the fact that corn crops ripened prematurely along certain narrow lines, and that snow remained unmelted longer along similar strips of ground than in other places. This led to excavations being undertaken and the exposure of an extensive system of streets and the foundations of large buildings. It appears probable that much of the material remaining above ground after the destruction of the city, was removed for local building purposes, and the font in the neighbouring Church of Wroxeter was made in Norman times from a portion of a Roman column. It is interesting to note that the depth of earth accumulated over the ruins was made use of by Darwin in his work on Vegetable Mould and Earth-worms.

The journey was then resumed along the north bank of the Severn to Buildwas, where the river was crossed and a halt made to enable the Director to draw attention to the peculiar features of the river valley. Rough diagrams were exhibited, showing, in plan and profile, the normal characters of the course of a mature river—the rapid and comparatively straight course near its source, where erosion and transport are active and the valley narrow, and the wide, open valley in which the river meanders when the lessened slope makes deposition predominate over erosion and transport.

Diagrams were then shown displaying the character of the course of the Severn itself, and the features of the valley as visible from the bridge were pointed out. Looking towards the west the broad valley was seen, with the river flowing in wide meanders and with evident traces of deserted bends in the form of " cuts-off " or " ox-bows." This condition is assumed almost as soon as the river enters Shropshire about 30 miles away, without measuring the meanders.

Towards the east was seen the narrow V-shaped valley of the Ironbridge gorge, where the river resumes the straighter course and swifter current which characterises it as it leaves the Welsh hills. This character is maintained for about eight miles, and below Bridgnorth the river again meanders in a wide, open valley, until it reaches the sea. Rising at a height of about 2,000 feet, the Severn falls some 1,400 feet in the first eight and a half miles of its course, and the remaining fall of 600 feet is distributed over about 200 miles.

The comparatively youthful character of the course through the gorge is indicated by the instability of the valley sides, which show signs of slips, some of which are still in progress. A diversion of the lower portion of the river as a result of conditions prevailing during the Glacial Period was pointed out as the probable cause of these anomalies.

The journey was then continued to the top of Wenlock Edge, where the characteristic features of an escarpment were well displayed, and the steepness of the scarp face as compared with the dip-slope was brought home to the members of the party by the fact that the direct descent of that face was declared unsafe for the motor omnibuses in which the journey was made.

The view from the top of the Edge was limited towards each side by the dense growth of trees, which extends along practically the whole length of the scarp, the higher and steeper part of which, being unsuitable for cultivation, is thickly wooded. The structure and origin of the escarpment were explained and attention drawn to the subordinate ridge due to the presence of the Aymestry Limestone and to the effect on communications of the parallel system of ridges and intervening valleys.

The ancient mass of the Wrekin rising abruptly from the younger rocks surrounding it was a prominent feature, and gave rise to some discussion.

The outward route was then retraced as far as Cressage, whence the journey to Shrewsbury was made along the south side of the river, emphasising the contrast between this part of its course and that traversing the gorge.

ORDNANCE SURVEY AND MAP ISSUES VII.

WALLACE E. WHITEHOUSE.

THE Autumn No. 1922 of the GEOGRAPHICAL TEACHER contained details of new publishing activities by the Ordnance Survey and a few more recent publications now call for comment.

ONE INCH TOURIST DISTRICT MAP.—The list of these maps as given in the Small Scale Maps Pamphlet (Price 6d, 4th Edition, 1923) is now a very extensive one, and recent additions have been of the same high quality as those previously noticed. Amongst the recent is the "Middle Thames" issue which includes that portion of the Thames from Kew Bridge to 3 or 4 miles above Wallingford. As both Watford and Woking are shown on the map it is obvious that the sheet is a large one—viz., 26 miles by 38 miles. It will prove attractive not only to tourists, but also to teachers, as it contains some good material for drainage, communication and town sites problems.

POPULAR EDITION ONE INCH MAP.—This edition, which has been commented on so favourably with regard to several of its issues, is now complete for upwards of 100 of its 146 sheets. It now covers practically all of Britain south of the line Anglesey to Louth, with the exception of Sheet 43 (Chester) and 44 (Macclesfield) which will appear shortly. Outside the above limits Sheet 17 (Isle of Man) has also been published.

QUARTER INCH MAP.—The new Scottish layer-tinted maps are well advanced and probably the complete set of 10 maps will be available before the end of the year. No. 3 (Forth and Tay) is as attractive in every respect as No. 6, previously described. These maps will form a most valuable supplement to the Quarter Inch Atlas of England and Wales, which is so deservedly popular.

HALF INCH MAP.—This is being revised and brought up to date. Several sheets are in hand, and will be available shortly.

NEW MAPS.

MINISTRY OF TRANSPORT ROAD MAPS.—These are now complete for Britain. The outline and water plates of the Ordnance Survey $\frac{1}{2}''$ Map have been used; streams and lakes blue, spot heights numbered (no contours, hachures or shading), place names in black. Class I roads in red and numbered (description of scheme printed on cover of map); Class II roads in green and numbered; other roads uncoloured. Paper, price 1s. 6d. This is an open outline map which will also prove useful for the mapping of other distributions.

MINISTRY OF TRANSPORT ROAD MAP OF LONDON AND ENVIRONS.—Published in 6 sheets each about 40 by 27 inches. These maps are on a 2 inches to 1 mile scale, which scale is necessitated by the intricacy of the road pattern in this area. The classification is the same as that used on the smaller scale described above. The maps are enlarged from the One Inch Maps, and in consequence lack the finish which one looks for in C.S. products. They are distinctly crude, and the exaggerated road-widths with the broad colour bands render the maps rather unsightly. Cloth-mounted 3s.

TEN MILES TO ONE INCH.—A new map of Great Britain on this scale, with contours and layer tints is to be published in three sheets. The map is now in course of preparation.

MAP OF ROMAN BRITAIN.—This is a new departure. It will be on a scale of 1 in 1,000,000 and will be contoured and layered. It is now being drawn and will be described in a later article.

GEOGRAPHY AND LANGUAGE.

DR. E. J. G. BRADFORD.

WHEN engaged in marking the written work of his pupils, every teacher of geography is made conscious, in a greater or lesser degree, of the difficulty which his pupils find in attempting to express in clear, adequate and unambiguous language their answers to the questions which have been set. The difficulty may be due to either, or to both of two causes,—inability to manoeuvre the words into suitable groupings for sentence formation, or inability to integrate into a coherent whole, words whose meaning is but imperfectly apprehended. In so far as the difficulty is due to the first cause, the geography teacher may with some justification claim that the remedy really lies outside his special sphere of work, it presents a problem which is specifically a problem of language and as such falls in the province of the English master or mistress. Just as in the political world every politician is a socialist, so in the school world every teacher is a teacher of English. Because modern government is inherently a social institution, and language is inherently the medium of the expression for knowledge. Nevertheless the teacher of geography is concerned predominantly with enabling the pupil to acquire a particular selection of information and experience and with helping him to integrate the whole into a coherent body of knowledge; whereas the teacher of language is more concerned with familiarising his pupil with the various modes of verbal expression and with giving him facility in the use of these various modes. A good deal of the vagueness and the 'woolly' character of the pupils' work is due to the inadequate meaning attaching to the words used, rather than to the forms of expression in which they are included. Perfect expression is only possible when the meanings of the terms employed have an adequate meaning in the mind of the author.

The word, unlike the map, is not specifically a geographical symbol of expression, and therefore it has in the past not received the attention that it deserves. Only in recent years has the map become recognised as an important symbol of expression in geographical work. Nearly every examiner expects written answers to be accompanied by relevant sketch maps, though the teacher is still somewhat in the dark as to the relative importance which the various examiners attach to the maps which accompany written answers. Pupils vary considerably in their ability to use sketch maps. At the one extreme are those who regard the map as a necessary evil, while at the other extreme are those who fail to see the need for a written verbal account when the whole of the information which they have to give is supplied by them accurately and tersely in map form. Not infrequently, it is the really keen student who is weak in the verbal expression of his ideas, he thinks in spatial rather than in verbal symbols. His answers are not usually vague but unduly brief, his difficulty is rather linguistic than geographical. All pupils, however, whether they like map work or not, are nowadays given practice in drawing maps, and copying sketch maps. They are given specific training in the use of this symbol of expression. It would be of considerable gain to the pupil if the geography teacher gave some equally systematic practice in verbal expression. It is just as much the function of the geography teacher to assist his pupils in developing the mode of expression through which his subject is made commensurate with other bodies of knowledge, as it is for him to assist in developing to the full that mode of expression which is specifically geographical. The pupil learns how to 'use' the map of Africa, he ought to learn how to 'use' the word 'commodities.' It is just as important that the word 'commodities' should not be employed when 'products' is the correct word, as that the outline of Africa should not be used to illustrate an answer which refers entirely to South America. The two southern continents have several features in common, as have also the two words which have been taken as examples, the points of difference are at least as important as the points of resemblance; but although all teachers ask pupils to draw maps and thereby discover which pupils recognise these differences to exist, yet few, if any, teachers require their pupils to use definite words to discover if they realise the differences which the different words imply.

Test results are given below which support the view expressed in the foregoing paragraphs, viz., that the vagueness and semi-inaccuracies to be found in the pupils' written work are due largely to their inability to use correctly both geographical and non-geographical words in the formation of their sentences. The pupils are given definite words to connect into sentences, and are left practically free as to the form which those sentences are to take; the result is that the inadequacy of the meaning of the terms is made more evident. The test was applied in three secondary schools to all pupils in the first, second, and third years of their course, and in two of the schools to the fourth year as well. One school was a school for girls, another a school for boys and the third was a mixed school. The test consisted of fifteen groups of three words, each of which groups had to be embodied in a sentence. Each sentence was marked out of a maximum of 3 marks. When a sentence was formed which did not disclose without doubt that the meaning of a term was clear in the pupil's mind, only 2 marks was given, when it was extremely doubtful only one mark was given. No mark was given where there was an obvious error. The difficulty of the test can be gauged from the sample given below.

"Each of the following groups of three words is to be used in making one sentence. Under each set of words write the sentence in which you have included them. The word *'and'* must not be used in any sentence."

1. Tide. Port. Trade.
2. Exports. Maritime. Civilised.
3. Industrial. Waterpower. Commodities.
4. Environment. Savannah. Pastoral.

The time allowed for the fifteen sentences, of which the above are samples, was half an hour, but their difficulty was such that few pupils were able to write much after the first twenty minutes had elapsed. Out of the maximum mark of 45 the following average scores were obtained. The number of pupils tested is given in brackets—

1st. year, 12.0	2nd. year, 15.2	3rd. year, 18.4	4th. year, 23.7
(305)	(261)	(205)	(73)

There appears to be a steady rise in the scores with a possible slight acceleration in the fourth year. (The numbers are somewhat small in the fourth year group hence the reliability of the average is correspondingly diminished.) The fourth year score is, however, only 50 per cent. of the maximum. Either the test is too difficult and unduly magnifies a weak spot in the current method of teaching, or else it points definitely to the necessity for some specific training in the use of geographical language. Many of the fourth year pupils succeed no better at this test than those in the first year. The extra information they have acquired during the school course has not been of very great assistance in giving them a command of geographical terms. A detailed analysis of the marks given for the four sample groups of words will make clearer the very gradual, too gradual, increase in the command of these terms.

Number of pupils who gain the designated number of marks.

	1st year.				4th year.			
Marks.	3	2	1	0	3	2	1	0
Group 1 ...	86	73	38	92	30	24	13	6
Group 2 ...	22	6	13	260	17	15	11	30
Group 3 ...	6	16	16	267	17	6	9	41
Group 4 ...	5	4	7	289	8	3	7	55

The test was given towards the end of the school year, thus the table above gives a sample of scores obtained at the end of the first and fourth years of study. At the end of the first year (86) 28 per cent. of the pupils undoubtedly can use the given three words of the first group in one and the same sentence, while after four years the percentage rises to 41 (30). The corresponding percentages are for group 2, 7 per cent. and 23 per cent.; for group 3, 2 per cent. and 23 per cent.; for group 4, 2 per cent and 11 per cent. It comes rather as a surprise to learn that only about a quarter of the fourth year pupils can combine three of these groups of words into sentences correctly and unambiguously.

The meaning of any particular term may be regarded as being equivalent to the number of other terms with which it can be associated in thought. For example, a town bred boy who was asked what the word 'farming' meant, replied "Keeping cows and chickens." Quite a number of boys in the same class gave equally accurate and equally inadequate descriptions. They were in Standard VI., and had been learning geography for several years. Many of the 'howlers' produced by school children are due to the fact that they connect terms which have little meaning for them. Only a few days ago the pictorial supplement of a well-known weekly newspaper gave a picture of discing operation in one of our drier colonies and labelled it ". . . . ploughing in . . .," although the picture showed clouds of dust following each machine besides a clear photograph of one of the machines in the foreground. The influence of climate on 'farming' can not be brought home with very great force to a child who thinks that farming consists only in keeping cows and chickens, nor yet to a class by means of pictures which confuse discing with ploughing. There is a natural tendency for all of us to mistake mere familiarity for knowledge, and unless someone points out the difference, or the difference is forced upon us by experience, we are likely to remain in a state of ignorance. It is the function of the teacher to guide and accelerate the process of learning by carefully controlling the child's experience in school, and thus continually making him realise that there is something to learn. The child will probably rest content for many years with the idea that farming means the keeping of cows and chickens, but the geography teacher cannot hope that his labour will have a very successful outcome, if he likewise is content for the pupil to have such inadequate meanings attaching to common terms, he must show the pupil the inadequacy of his ideas and furnish him with the necessary information for developing them further. The language teacher may be able to get along with less detailed knowledge than is required by the geography teacher, but there can be no doubt as to which teacher should regard it as his duty to ensure that an adequate meaning does attach itself to any term used in geographical description.

The following are some of the answers to the test questions, the age of the writer (in years) is given in brackets :—

> Portsmouth being a port with more than one tide, is important in affairs of trade (17½).
>
> Civilised people make use of maritime occupations, that is sailing, to send exports to foreign countries, also to send missionaries to uncivilised countries (17½).
>
> Waterpower is one of the commodities used in industrial affairs for the making of electricity (17½).
>
> Owing to the pastoral environment one point of the region of the savannah in South Africa was called Cape Verde which means Green Cape (17½).
>
> The easy access of waterpower increases the industrial commodities of a district (16½).

If the people of a maritime country are civilised the exports are generally good (16½).

Savannahs, or pastoral lands, are environments for farmers (16½).

The tide which entered the port greatly improved the trade (15).

The maritime people brought the exports back from the civilised people (15).

Waterpower often improves industrial commodities (15).

Waterpower commodities are helpful to the industrial world (16½).

This maritime town exports goods to all civilised countries (16½).

The pastoral district of Savannah has a most beautiful environment (16½).

These sentences are taken from the papers of four boys in the best class tested. They provide a very fair sample of the sort of imperfect meaning which the terms have in the pupils' mind. They also give one the feeling that a little *ad hoc* instruction would do much to clear up this haziness. Under present conditions these pupils will either gain a clearer idea only as the result of considerable reading or they will remain for ever merely familiar with the terms—

"Impervious rocks are not a sauce of drainage."

"It is uncivilised to get mixed with Altitude as well as Latitude."

"Where Altitude and Latitude meet it is unknown thus uncivilised."

"The climate in this region outputs the minerals."

"When the climate is output many people drink Minerals."

"The exports of maritime soldiers to Ireland where the people are uncivilised."

"Holland has very good drainage, not many highlands or rocks, it is also a very Impervious state."

The second selection of sentences is taken from the papers in the lower part of the same school. They show the same features as the first selection, but the meanings of the terms are so curtailed or inaccurate that the resulting sentences are ludicrous instead of being merely 'fuzzy.'

When Lewis Carroll wrote,

'Twas brillig and the slithy toves
Did gyre and gimble in the wabe,

he took pains to explain what the new words meant, instead of leaving the reader with the mere sense of familiarity which the sound of the words undoubtedly convey. It is surely also advisable for the geography teacher to explain clearly, and often, the meanings of the words which he uses or which the children meet in their text-books, even though they sound familiar. Familiarity may enable the pupil to gather something of the gist of the text, but it does not provide a satisfactory guide for actual writing. Not only are casual explanations of terms necessary during class teaching, but whole lessons can quite profitably be devoted to developing the meaning of a word. Few teachers could explain adequately to a class of eleven-year-old children the meaning of the word 'port' in less than half-an-hour, even with the assistance of good pictures. Not many teachers consider it necessary to spend a whole lesson in developing the necessary background for such terms, yet what does the average elementary school child of, say, eleven or fourteen years of age really understand by the terms 'trade,' 'communications,' or 'agriculture?'

If an adequate meaning is to be given to terms used in geographical writing, then the subject matter of the geography course, especially in the primary school, will have to be orientated more frequently around 'topics,' instead of being passed through the standard machine, the machine, which if fed with a country at one end, invariably turns out the position, climate, and products at the other.

THE SWISS TOUR, 1923.

W. Norman King, M.Sc., Johnston School, Durham. Leader, Second Party.

The Geographical Association's Touring Committee is indebted to Dr. Nägeli and to Mr. W. Norman King for their help in conducting the Association's parties over the familiar ground discussed in this article. It was felt that our early excursions in Switzerland should follow well trodden ways and, by studying geographical interpretations in these familiar places, help to spread a more *vitalised appreciation* of the geography of the Alps.

THE lake of Lucerne (Vierwaldstätter See) with its girdle of ridges and peaks was the first and main objective. Its structure and shape are most peculiar. The western end sprawls like a giant star-fish from Luzern to Vitznau and from Alpnachstad to Küssnacht, while the eastern arms form a huge rectangular depression obviously connected with Lake Zug and the Lauerzer See. Prof. Heim has contended that the weight of huge folded masses of the central Alpine area to the south caused a deeg sag which would be equivalent to an elevation north of the Lake of the Four Forest Cantons, and this, he claims, gave rise to the lake in its present form, uniting the two areas already mentioned into one vast basin, with its outfall at Luzern, the most recent part of the lake. Prior to this, it is probable that the Engelberger Aa flowed from Alpnachstad behind the Bürgenstock and, joining the Reuss at or near Brunnen, flowed out northwards through the Lake of Zug. The reversal of the river terraces in the latter area, and the well marked valley north of Stans confirm this reasoning, while our examination of the Bay of Uri, with its flat bottom and wonderfully folded marginal crags convinced some, at least, of the justice of Heim's claims. The growth of the Reuss delta is materially affecting the site and growth of Flüelen and dredging is now necessary to keep the fairway clear for steamships. What a contrast with the clearness of the water where the Reuss leaves Lake Lucerne.

The structure of this basin is no less interesting. All along the northern shore rise the peaks and ridges of Nägelfluh, best seen perhaps in the Rigi group. The gentle eastward dip of these masses of pudding stone or conglomerate gives rise to "desk-like" hills, with steep scarps or "steps." The view from the other side of the steamer was in marked contrast. Pilatus, with its five well-marked folds of Cretaceous rock, with their infolded pockets of Eocene Flysch stood like a sentinel and outpost of the great fold region to the south, while behind it close by rose these strange masses, pyramidal in shape, the Stanserhorn and Buochserhorn,—mountains without roots. Further east we again encountered specimens of Klippen, as the latter are called, in the Great and Little Mythen, well seen from Brunnen, where the older Triassic and Jurassic overlie the younger Eocenes, either as the result of overthrusts or as the last remnants of recumbent foldings in which the normal geological sequence has been reversed. Here we saw, in little, what Alpine folding really means, for these rocks had been thrust and folded right over the main axis most probably from the Lugano area, and are now lying on a surface unrelated to them in origin.

Then on to Engelberg, passing on the way moraine after moraine left behind by the Glacier of the Aa. Here and there was a rockfall constricting the valley and offering a suitable place for power generation. Here, also, as elsewhere, we noticed that aerial transveyors were being used to obtain the timber of the higher slopes, enabling the workers to stay in their own homes and making long migrations unnecessary. Students of Human

Geography found Engelberg, and the places reached from it, an excellent centre for study. The "mountaineers" duly made the ascent of the Titlis which dominates the whole valley, rising from Trübsee in gentler curves, but falling steeply in enormous precipices well seen from Staffelalp. Visits were made to the Arni Alp and to Trübsee, where cheese-making in temporary dwellings was in full swing. At Gerschni, Arni, Herrenrütli and elsewhere, the dwellings were occupied by families, but the higher settlements were occupied by men and boys only. This is rather curious, especially at Blacki Alp, where there is a chapel. The Uri Dialect seems to be almost exclusively used by these herders. The writer would suggest that a future tour should include a special study of the occupations and of transhumance on this Surenen route, as conditions seem so favourable. Trüb See gave us our first real views of ice-action, the striations being most marked just below the lake, where the former Titlis glacier after ploughing out the basin, made its way towards Jungholz over a huge ice-fall with many moulins. We were so fortunate both at Trübsee and on the Surenen as to find the Alpine flowers still flourishing, three species of gentians, a tiny primula, much less than but greatly resembling our own primula farinosa, being found, together with the alpenrose and much "grass of Parnassus." The wretched weather and heavy snows of late spring and early summer were responsible for our good fortune in this respect. A storm prevented the second party from crossing the Joch Pass but enabled us to see the Brunig Route with Lake Sarnen and its picturesque towns, and gave us time to see Meiringen and its wonderful falls, of the upper and lower Reichenbach. Here it was evident that we were in a zone of much older rock and the sides of the upper Reichenbach yielded good specimens of slickensliding. The Aar gorge through the Kirchet, with its vertical sides containing pot-holes from top to bottom was an unforgettable example of river action while the flat alluvial basin round Innertkirchen was a surprising contrast. Next day the Swiss Post Auto-Service carried us into and across the heart of the crystalline massif, with its gneisses and phyllites. At Guttannen the valley became barer and irrigation canals spread the water over scanty patches of barley and potatoes. At Handeck, where the rock has been tunnelled to make the Grimsel Route possible for motor traffic, there is a double cascade formed by the Aar itself (with a wonderful rainbow, in sunlight) and also by the Erlenbach which plunges into the main fall from the west, over a reef of grey granite intercalated between the gneisses at this point. A long climb brought us through this bare and gloomy gorge, to the Grimsel Hospice with its lake, now undergoing drainage, and rounded hummocks of bare and striated rock. Then by a series of thrilling hairpin bends we reached the summit and obtained our first view of the Rhone Valley and the Furka Pass, beyond Gletsch. The glacier seems to have retreated here but the ice cave is much larger and the Alpine plants on the old moraines are not quite so numerous. The morning found us on a long trek to Grindelwald, over the Grosser Scheidegg, our way leading first over the fields, by unfrequented paths to Geissholz with its fragrant pastures of lucerne and on, past the roar of the Reichenbach, to Zwirgi and Rosenlaui under the shadow of the Wellhorn and Wetterhorn, whose steep limestone scarps, rising sheer to a height of 2000 metres, dominated us for the rest of the day, past the squat huts of the high pastures of the Scheddegg until we reached the Grindelwald Glacier and were confronted with the Eiger and the Mettenberg, twin guardians of Grindelwald, into which all Britain seemed to have been poured. The Faulhorn with its crumbling slopes and shattered debris, with its hut, half farm, half refuge, gave us our first real view of the whole chain, while to the north the Mollasse Plain and the heights beyond could be clearly seen, and at our feet lay Lake Brienz and far to the right Luzern, with the bend towards Brunnen plainly visible. As we turned south, the mists lifted (we had started in the rain) and slowly, peak after peak became visible, Wetterhorn, Eiger, Mönch, Mettenberg, until finally the Jungfrau unveiled herself to our unexpected delight. Few of those who saw this will forget that day on the Faulhorn.

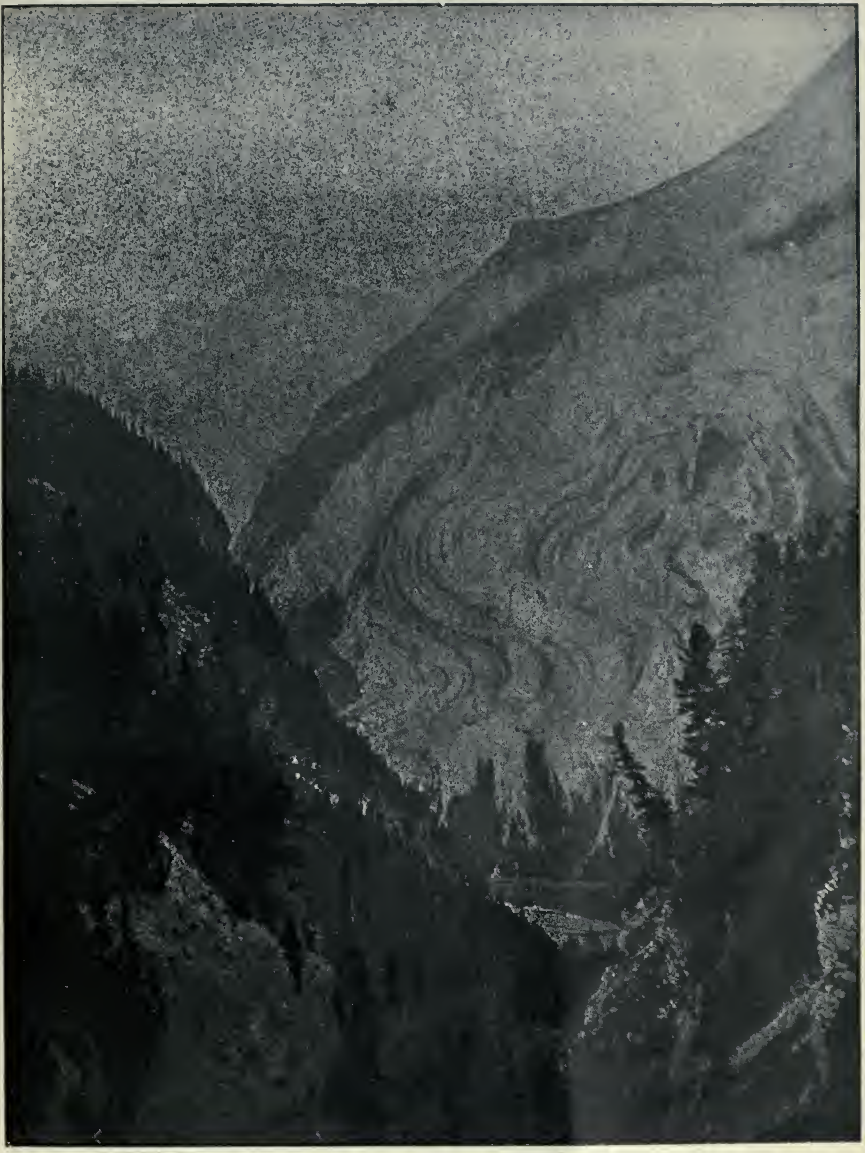
There remains but little space to describe Lauterbrunnen with its thundering Trümmelbach seen in gloom and partly by artificial light. Here a mountain stream is working back along a vertical major joint in the limestone and repeating on a smaller scale the action of the Aar at Meiringen. On the opposite side of the flat U-shaped Lauterbrunnen Valley the Staub-Bach plunges down from a hanging valley to form a delicate stream of flying spray, which, seen as we saw it, in moonlight, looked like the mere ghost of a waterfall. Beyond Stechelberg, the valley narrows and is V-shaped, being almost too narrow for anything wider than a footpath. Mürren was visited for its view of the Jungfrau and from the terrace, the structure of this vast mountain mass was plainly seen. The summit is of gneiss apparently kneaded or thrust into and over a mass of Triass and Jurassic sediments much folded, and which form the slopes separating the Silberhorn and the Black Mönch. Overlooking the Lauterbrunnen Valley the latter mountain is chiefly hard shale together with milonised gneiss with a pocket of Eocene crowning the first shoulder.

Interlaken, too, had its problem of a different kind. As is well-known Interlaken stands on the low, double fan of outwash deposits brought down by the Lutschine on the one hand and by the Lombach on the other. The Aar itself is diverted first to the right by the Lütschine and then to the left by the Lombach. There is a difference of 5 metres between the levels of the two lakes. It is usually assumed that this difference is caused by the gradual downcutting of the barrier at the outfall of the lake. My friend, Prof. P. F. Kendall, however, assures me that, in the similar case of Derwentwater and Bassenthwaite, this is not so; and an examination of the lakes showed that the difference in level is not due to the lowering of Thun (for clear water has little erosive power), but to the rise in level of Brienz, as the "corrom" or low delta between the lakes is built up, year by year, by fresh deposits of silt. It may be added that Prof. Kendall's view is accepted by Prof. Collet, who is perhaps our greatest authority on lakes and their formation.

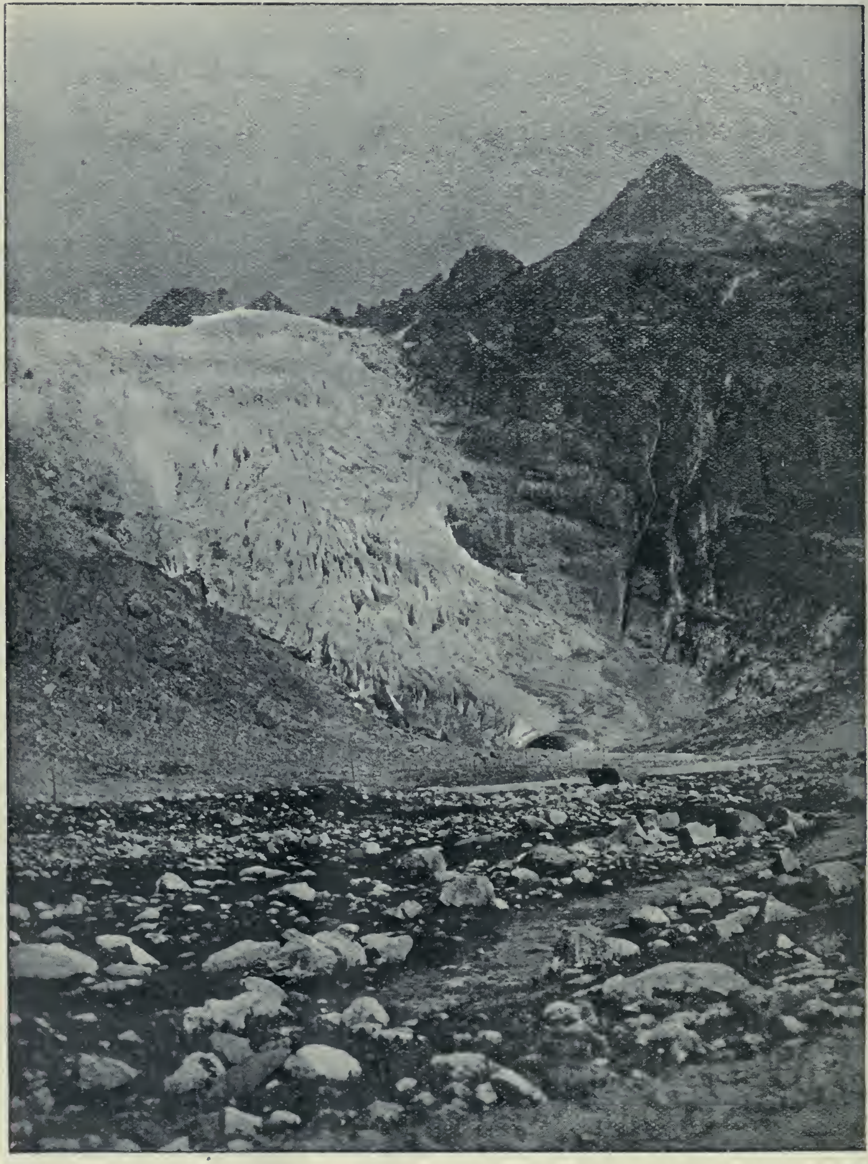
From Interlaken we journeyed to Kandersteg, at the northern end of the Lötschberg tunnel, with its remarkable windings. Of the excursions from here, to the Blausee, to the Oeschinen See, and to the Gemmi there is little space to tell. Here again one met the complex fan-like folding, such as our illustration shows. The Klus by which the Kander leaves the Gasteren Thal is a deep rocky ravine with many cascades. The Gasteren Valley itself has steeply inclined sides, but the gorge itself has been filled with a mass of alluvium attaining a depth of five hundred feet. That forms the flat floor of the valley and trees are now obtaining a foothold on many of the strands and mud banks. Tunnelling operations in the construction of the Lötschberg were much impeded by this mass of gravel, and steel tubbing was necessary to hold the loose deposits, which flowed like water as soon as the drills pierced this mass of detritus. Seen from above, the deposit seems too minute to have caused such trouble and expense.

We bade farewell to the mountains at Berne, where from the Bundesterrase we saw the whole Bernese range from the Wetterhorn to the Blümlisalp, the purely calcareous peaks like the Wetterhorn, the Blümlisalp and the Doldenhorn standing out with a bulky outline in strong contrast with the noble pyramids of crystalline mountains like the Finsteraarhorn, the Schreckhorn and the Breithorn.

Those interested in Alpine structure should not fail to read Prof. Heim's remarkable paper on the weight of mountains. It is a record of the work



Contorted Rocks. The Klus near Kandersteg.



The Rhone Glacier from Gletsch showing Erratics and Ice Cave.

done by Swiss geologists during the war. An excellent summary has appeared in the Transactions of the Liverpool Geological Society, Vol XIII, Part 1. In it, Heim shows how slight deviations from normal gravity (g) are distributed over the Swiss Alpine area. In the higher parts it appears that there is mass defection, or in other words, gravity is too little; while in the lowlands, there is mass excess, i.e., gravity is too great. As this is just the opposite of what one would expect, the discussion is remarkably interesting, especially when its bearing on the origin of such lakes as Luzern, around which so much discussion has raged, is borne in mind.

It is to be hoped that, in future years, our Tours will be arranged so that those who wish to carry on definite research work will be able to do so. Nevertheless, we all felt that an excellent start had been made, and those who met him found in Dr. Nägeli a trusty guide and a new friend.

Note.—Heim's original paper (in German) is published in the Swiss Alpine Club Annual, 1918.

Chile To-day and To-morrow. L. E. Elliott. pp 340 and folder map. 20.5 x 13.5 cm. New York: Macmillan, 1921. 24/-.

This is a book that will please the non-specialist teacher, with its numerous and well chosen photographs and its easy text. It considers the country's history, geographically, economically, and administratively, and refers here and there, in the text, to various published works, but the lack of bibliography is to be regretted. A short but welcome section touches the country's ethnography, and the chapter on Easter Island, a dependency of Chile, is up to date enough to give an account of the Routledge expedition. A folder gives two maps, one of political divisions and one of railways. The account of the famous nitrate and of theories as to origin will be welcomed, and we may note the statement that 95 per cent. of the nitrate is still untouched. It will be in the minds of teachers who use this book to refer to Jefferson's studies of Chile (Rainfall, and also Recent Colonization) reviewed in this Magazine, Vol. XI, p. 273.

Festband. A. Penck. Englehorn, Stuttgart, 1918. 440 pp, 23 x 16 cm.

This is not a book by Professor Penck, but a gathering together of articles by his pupils into a volume issued in honour of his 60th birthday. Papers on many aspects of geography follow an introduction signed by a long list of his students. Penck's work, especially on Alpine problems, has placed all the scientific world in his debt. We hope he may publish a supplement to the "Alpen im Eiszeitalter" giving his interpretations of discoveries and ideas which have come forward as a result of the publication of that great work on which most of us directly or indirectly depend.

Machatschek reviews theories of epeirogenetic movement, and thinks folding is largely caused by changes in the deeper magmatic masses in the earth's crust, lateral stresses being converted in many cases into vertical ones, resulting in uplifts. He points out what he considers to be weaknesses in the theory of Isostasy. A good bibliography is given. Papers by Lehmann and Sölch are devoted to questions of modes of valley formation, while Schen discusses dry valleys. Glaciologists should note Lacerna's detailed observations of the outlines of moraines of the Pasterze neighbourhood (Buhl, Gschnitz and Daun outlines are given) near the Glockner chain. The surfaces of the plains of Central Europe are discussed by Wunderlich. Frey gives an account of the south flank of the Harz, while Rudnyckyi writes about the Podolian plateau.

An important survey of climatic variations in India, 1813—1912, comes from the famous pen of Ed. Brückner. 1814—28 was generally moist for the Deccan, 1829—43 dry, 1844—49 moist, 1850—75 dry, 1876—94 moist, 1895—1911 dry. To some extent Burma and Java show contrary variations. The range of variation is about 20 per cent. of the average, and the variation seems usually to affect all seasons, though the winter rains of the Punjab vary independently. The variations are connected in some way with the condition of high pressure areas in the Indian Ocean both north and south of the equator. Merz gives data about currents in the Bosphorus which should have the attention of students of Constantinople. Krebs has an interesting, if boldly generalised map of the Balkan peninsula, apart from Greece, in which he tries to map the country according to its habitability. Behrmann discusses native settlements in the interior of New Guinea, J. Mayer takes up place names in Austria in -ing, and gives a useful catalogue; he finds that they are mostly of the eleventh century, and occur in fruitful places as small settlements. Heiderich appropriately discusses the development of the world market. Heyde reviews the German determination of the zero-point in observations of altitude for cartographical work.

REVIEWS.

My Life with the Eskimo. London: Macmillan, 1913. 538 pp. 23.5 x 15.5 cm.

The Friendly Arctic. London: Harrap, 1921. 784 pp, 23.5 x 15 cm. 30/-.

The Northward Course of Empire. London: Harrap, 1922. 294 pp, 20 x 13.5 cm. 7/6.

Hunters of the Great North. London: Harrap, 1923. 288 pp, 20 x 13.5 cm. 7/6. By V. Stefansson.

It is an insufficiently appreciated commonplace that what we bring in our minds has a very direct influence on what we see and on our records of observations. Thus the famous Mappa Mundi shows us the city of Jerusalem at the centre, and the general arrangement of land and sea is greatly influenced by this fact. So also colour-prejudice leads many a Britisher to class together the inhabitants of S. India and W. Africa, and thus to demonstrate his ignorance of many matters weightier than that of skin pigment. One of the most persistent and most serious difficulties that affects both our observations and the actions based upon them is that fear which is the child of ignorance. We are afraid of the unknown, and we endow it with qualities, or rather defects, which often prevent us from conquering our terror. One has but to move among French and Germans to realise the part that mutual fear has played and is playing in the long crisis we are traversing, and to see that more general mutual knowledge would be one of the most effective of all solvents of ill-feeling. In not very dissimilar fashion men's fears of the unknown have operated in many regions to keep them the slaves of custom, and too often, even in our own country, to eliminate the man with initiative as a disturber of custom. A hunting group will often range only a particular area, and its members may need great pressure to induce them to try a new range even though it may be rich in resources. It often needs the conjunction of many factors to make a new venture a success, and the initiator has failed many a time, not because his idea was wrong, but because the conjunction was not complete, the weather went wrong at a critical moment or a little accident destroyed the experiment, though it would have been held to be trivial if it had occurred in an established routine. Doughty, in his "Arabia," tells us of the power of routine among the Beduin, and every mythology is full of personifications of terrible unknown powers. Several writers have worked out the influence of these restrictive feelings even upon such special initiators as the great explorers and pioneers of settlement. The terror of the loneliness of the Canadian prairies is well known to have given rise to strong feeling against the building of the C.P.R., and settlers in pioneer days in the Mississippi basin were long wont to restrict their attention to laboriously made forest-clearings (H. H. Barrows' "Geography of the Middle Illinois Valley," 1910), while the rich prairie was left untouched for years. Stefansson urges that analogous prejudices are at work perverting and restricting our knowledge of Arctic Regions and of their possibilities. His explorations and his views are set forth most accessibly in "My Life with the Eskimo." "The Friendly Arctic," "Hunters of the Great North," and "The Northward Course of Empire," the last being partly a reprint of magazine articles. The second of these books is a serious and most interesting account of an expedition which went into the Arctic in 1913 and returned in 1918, after Stefansson had secured experience by several years of Arctic work.

In his books he claims to have opened up some new methods which are of great value. It was a habit of explorers to carry as full supplies as possible by sledge, because large stretches were supposed to be lifeless wastes, and the idea of such wastes continued to persist, because men hurrying along on their sledges were not likely to see many wild things. A large part of the sea has been described as "The Polar Ocean without life" by explorers, who probably never trusted themselves on its ice-floes, and so were naturally unlikely to spot the seal-holes there. Stefansson deliberately planned to "live off the country," and so was able to travel far lighter. But to do this he had to adopt some of the arts of the Eskimo, to go to the Eskimo for help from their traditions, while at the same time keeping himself free from the fears they themselves suffer from regarding adventures untried in their past.

According to Stefansson, temperatures lower than 50 edg. below zero Fahrenheit are rare on the north coast of America, and often the thermometer does not get down below 45 deg. F. during a year. Towns in far more southerly latitudes in U.S.A. have recorded temperatures down to 68 deg. F., and yet they are permanent towns. The summer temperatures rise very high (sometimes to 100 deg. F.), and the long duration of sunshine is another factor encouraging considerably more plant growth than at times we imagine. The amount of snow on the lowlands of the north coast of America in winter is said to be small; we are then in a region of light precipitation. In summer they become prairies in many parts, with grass and flowers, and the level of perpetual snow is a relatively high one. Needless to say, this statement does not apply to Greenland, an island of very heavy precipitation and unusual elevation of almost the whole surface. One of the many interesting details concerns the well-known fact that the Arctic subsoil is frozen. To Stefansson this appears to be an advantage in many places, for this frozen subsoil acts as a reservoir of water, and some of the water melts in the summer, thus insuring the Arctic prairies against drought. Apparently Stefansson fully confirms previous reports of the Arctic Summer, which dilate on the mosquitoes, sandflies, and other pests. The wealth of the Arctic in mosses, lichens, and so on, has been exaggerated in well-known fashion into an idea that this is all the vegetation there is in the North, by references to the reindeer pawing up mosses from beneath the snow. Sir Clements Markham long ago drew attention to the fact that flowering plants are abundant, both in species and in quantities, on the Arctic lowlands of America. These summer prairies already give food to quantities of imported reindeer, and it is thought that the imported breed is mixing its blood with that of the wild caribou, producing modification, it is hoped, in the direction of increased size and strength. This notion of the modification of breed by admixture between domestic animals and their wild cousins is one that has been developed at considerable length in connection with the old established breeds of cattle in the British Isles, especially by Dr. Ritchie (1921. "Influence of Man upon the Domestic Animals and Animal Life in Scotland"). Stefansson suggests that the reindeer may need shelter in the calving season (in spring), but is clear that apart from this, very large numbers can find food and keep healthy. Reindeer meat at present is said to have a very good market, and Stefansson looks forward to large extensions of the Arctic herds; in fact, he thinks that there has been too much effort to spread the wheat-line northward, because occasional frosts, even on midsummer nights, may spoil the crop. He also thinks it may be possible to increase the herds of so-called Musk-ox (Ovibos), and perhaps to domesticate that animal, though it is probable that man achieved his last success in real domestication in the Stone Age. His further ideas for economic development of the Arctic, apart from coal and oil, depend upon the extension of the various fisheries which he deems possible, and which may take on new forms if his experience of the possibility of seal-hunting on stretches of sea-ice in winter is confirmed.

Among the difficulties that will have to be faced will be the control of wide-ranging herds always liable to mix with wild cousins, and the difficulties of transport, though, in Stefansson's opinion, railways and aircraft should dispose of the latter difficulty. A network of wireless stations would also greatly help steamers to penetrate the Arctic Seas, and this may be used as an illustration of the argument that it is likely to be by the thoughtful co-ordination of several efforts that the utilisation of the Arctic Regions will be pushed forward. Stefansson further thinks that when the regions concerned are well mapped the danger of polar voyages by submarine should be less than the dangers of the voyages made on ships by Peary and Nansen, dangers which have now been somewhat lessened for the successors of those famous explorers. Stefansson claims that, by careful organization and adaptation of Eskimo methods, a great deal can be done towards making life in the Arctic more possible for persons of suitable constitution. Fur clothing sewn in Eskimo fashion keeps up the body temperature; in fact, Stefansson thinks this, along with the high temperature of the hut-interior, a factor of the well-known early maturity of the Eskimo. The reader of Stefansson's books will gather much information about the life of the Eskimo, and may with advantage use it to correct several books in use in schools as well as some films that have been circulated far and wide.

Many matters connected with Eskimo origins and characteristics are matters of scientific discussion, and Stefansson's views are given at some length in his various books. With these problems the present article does not concern itself, our purpose is to draw the attention of teachers to his suggestion of a new attitude of mind towards northern regions, in the hope that they may read not only his works, but others written from other points of view, and so gain an intelligent interest in a part of the world, which, in the past, has certainly been very indifferently expounded by most of us who try to teach geography.

A Junior Economic Geography. By O. J. R. Howarth. pp 95. 18.9 x 12.6 cm. Oxford University Press. 2/6.

This is a shortened and simplified version of Mr. Howarth's "Commercial Geography of the World," but it still retains many of the features which made the large book so attractive. The chief plant, animal and mineral products are included in the first half of the book, and very readable accounts are given of their distribution and preparation. The second half is devoted to a regional treatment of the subject; the "snippets" character of so many books dealing with economic geography is largely avoided by the obvious care which has been taken in the selection and the arrangement of these regions. It is very suitable for Junior forms.

W.E.W.

A Course in Human Geography. By J. Fairgrieve and E. Young. G. Philip. 8/6.

This is simply Books 1, 2, and 3 of the Human Geographies (Secondary Series) by the same authors. The individual books have been reviewed in these columns and are excellent in every respect, but there seems to be no reason for the volume in this form. It has practically 900 pages in all, and is heavy and difficult to handle; the pages are not numbered consecutively, and the three indexes have no connection with one another. The books bought separately cost 9/3, so the reduction in price is insignificant, and a more serious criticism is that the component books are likely to need varying amounts of revision. Teachers are recommended to purchase the work in its original form.

W.E.W.

Wall Atlas of the Countries of Europe. Cloth, folded, eyeletted. Philip. 7/- each, or set of 6 in case, 40/-.

It is extremely difficult to do justice to these maps in a short notice, for it is no exaggeration to say that they are equal in quality to several of the well-known orographical maps produced by French and by German firms, and they are most reasonable in price. Each map is 48 by 38 inches, and is on a scale of 24 miles to one inch, and the sheet margins have been carefully chosen so that the geographical regions are well arranged for comparative study. The scheme of colouring and of conventional symbols and the actual printing reflect the greatest credit on all concerned, and the production deserves a wide sale. Teachers are advised to consult the leaflet issued by the publishers, who have not erred on the side of modesty with respect to their claims for the maps though their description appears to be justified.

W.E.W.

Geography and the Blackboard. By Robert J. Finch. pp. 100. 24.8 x 18.8 cm. Evans Brothers. 4/6.

Mr. Finch's success as a teacher is well recognised, and in his as in many other cases this success is due to a satisfactory combination of material and method. A special welcome will be given to this book because it affords evidence as to method. It is brimful of hints, and the young inexperienced teacher will find much that really helps, and it all dovetails so well that one must emphasise the writer's own remark that "the diagrams are merely suggestive," and are not intended to be slavishly copied. With Mr. Finch's own handling of them their success would be assured, as he would call the attention of his class to the fact that in many cases one important point, and one only, is being shown. The suppression of this or that other point is justified on those grounds only, and he would no doubt keep the duster handy. For example, in the case of Fig. 7, having illustrated the point, we should search for the duster before Bright-boy Smith realised that we had told him that 1 in 2 is a gradual slope, and again in Fig. 31 we should hope that we had the board clean before the more intelligent pupils noticed that our shadow line *on the earth* varied in length by *many millions of miles* between June and December. Teachers will be interested in the book, and it really has many excellent points.

W.E.W.

Railway Map of Great Britain. 15 miles to 1 inch. Cloth, folded. Johnston. 5/6.

Another example of those maps recently prepared by the leading map publishers to show the 1923 scheme of railways grouping. The present map possesses several good features. It is well printed on good paper, and is well mounted; there are many larger inset maps showing the railway communications of the more densely populated parts, with the individual railway lines shown by their appropriate colours; all names, of which there are an unusually large number, are clearly printed in a very attractive lettering. A few items noted during a hasty examination of the map seemed to suggest themselves for consideration. The dark blue used for the L.M.S. group is likely to be confused with the black line used for ungrouped railways, particularly in artificial light. Motor routes are distinguished from coach routes, which may lead to misunderstandings, and, in any case, the rapid extension of the former practically ensures that the map is out-of-date before it can be distributed; further, the coach route symbol resembles the county boundary symbol rather too closely. The land area is shown by a pleasing brown tint, while peaks and ridge summits are shown by microscopic hachured cones, which certainly do not obscure the other detail, but which can have but little meaning on this particular map; the heights of many of these peaks are given, though the system employed is not obvious, e.g. the highest mountain group in Wales is not numbered though subsidiary ones are given to the nearest foot. Probably the least obvious matter is the system controlling the inclusion or omission of any particular river. No purely Welsh river is shown at all. Again, the only rivers marked between the Trent and the Exe are the Ouse, Thames and Avon, though between Cape Wrath and Aberdeen no less than 18 are shown; this seems to be an unfair insistence on the Scottish origin of the map.

W.E.W.

The Preparatory Geography. By W. J. Barton and W. L. Bunting. Oxford Press.

This well thought out course is likely to prove extremely valuable to many non-expert teachers of geography. It is to be regretted that such books have to be published, but it is acknowledged that they *are* necessary, and will be needed for some time to come. In the circumstances it is more than fortunate that the authors have produced such a sound educational scheme. The work consists of six exercise books, three at 8d. each and three at 10d. each; these are sufficient for three years' work with pupils aged, say, 11 to 14. The books contain the printed exercises, blank spaces for answers, and the requisite outline maps. Even if less well prepared and less well printed they would still be cheap, and it is only fair to the authors to say that the experienced teacher will profit by an examination of a scheme that bears every impress of careful work. In addition to the exercise books there is a Handbook for Teachers (price 6/-, pp. 112), and this is so lucid and so well graded that it is obvious that the more closely the non-expert teacher follows the instructions the sooner he will be able to dispense with the handbook. W.E.W.

Philips' Modern School Atlas of Physical, Political and Commercial Geography. 28 x 22.8 cm. Philip. 7/6.

This contains 112 coloured plates which have upwards of 300 maps and diagrams. The volume consists of two distinct sections: (a) Modern School Atlas of Comparative Geography, (b) Modern School Atlas of Commercial Geography. Section (a) is a well-known production of the London Geographical Institute, and has been brought up-to-date in many details. The orographical and climatic maps are particularly good, and the arrangement of material and colour schemes have been carefully planned. Section (b) can also be purchased separately (price 3/6), and is a new and very valuable atlas. The introductory 14 pages form an elementary text book on the subject, then follow numerous distribution maps dealing with many commodities, and in addition there are maps resembling those given in the Wall Atlas of Commercial Development which has already been favourably reviewed in these columns. The maps in Section (b) are rather more complicated than those in Section (a), but are very successful with the possible exception of "Occupations and Communications," pp. 2 and 3, which map is neither artistic nor legible, and should be the subject of further experiment. The Atlas, as a whole, will meet all reasonable examination demands up to the Training College stage.

1. Place Names, Highands and Islands of Scotland. A. MacBain. 381 pp, 22½ x 14½ cm. Stirling :Mackay, 1922. 21/-.

2. The "Abers" and "Invers" of Scotland. E. Beveridge. 128 pp, 22½ x 14½ cm. Edinburgh: W. Brown, 1923. 8/6.

Dr. W. J. Watson has collected together a number of articles dated about 1890—1906, by the late Dr. Alexander MacBain, who was one of the pioneers of the more careful variety of etymological study of place names, though his point of view now seems a little out of date, for he thinks of the Picts as the first Celtic inhabitants of Scotland, and ascribes to them a language akin to Welsh. Students would not now risk any such statement. Nor would most students give as much attention as did Dr. MacBain to the hunting out of Indo-Aryan roots. The proportion of Norse names in different parts of Scotland is used as an indication of the way the Norse conquest progressed, and here, granted the soundness of the etymological analyses, the author is probably on fairly safe ground. The Norse raids began about 800, and soon the Orkneys and Hebrides were occupied. In Dornoch district the proportion of Norse names is one in three, in the Dales district (Tongue, etc.) it is about two in three; they end altogether with Tarradale and Eskadale in the Beauly district. Skye is claimed to have been very completely occupied by Norsemen. Lochalsh (Argyllshire) is almost completely Gaelic in names. In the Long Island Gaelic names have been swept out of Lewis, but abound in Harris. One-third of the Islay names are Norse and the proportion in Arran and Man is about one-eighth. The sorting of supposed Gaelic and Pictish names is a matter of grave doubt, and we know very little of the complications that earlier languages may have left, nor do we know enough about the use of the term Pict to say much about it.

Dr. Beveridge lists the names with "Aber" and "Inver" in Scotland. Both terms mean river mouth or confluence. Names with Aber are common in Wales and many parts of Scotland, those with Inver in many parts of Scotland and in Ireland, but not in Wales. Argyllshire is rich in Invers but poor in Abers, but apart from this there is nothing like mutual exclusion of each by the other alternative, so we can hardly at present make a hypothesis ascribing one to Gaelic and the other to Brythonic origins. The making of catalogues and of maps from the catalogues is, however, one of the most promising lines of advance in place-name study, and it is one in which teachers of geography may well help materially. If the first draft of a catalogue occasionally includes names that have no right there the mistake can be corrected later, so this is a field in which teachers may well work, and they will often be rewarded with a new view of the way in which the settlement of their district has progressed.

Studies in Religion, Folklore, and Custom in British North Borneo and the Malay Peninsula. By Ivor H. N. Evans, M.A. 299 pp. 23 x 14½ cm. Cambridge University Press. 1923. Price, 20/- net.

In this volume Mr. Evans has gathered together a number of papers which have apeared in the "Journal of the Anthropological Institute," in "Man," and in the "Journal of the Federated States Museum," either substantially as they are given here, or in the form of notes. The articles on British North Borneo are a valuable supplement to the information given in Mr. Evans' book on the peoples of British North Borneo, especially as regards the up-country Dusuns, the original inhabitants of the country. The Bajau and Illanun, both Proto-Malayan peoples and an intrusive element, although presenting many characteristics of interest to the students of racial psychology, being Mahommedans, do not afford much material for the consideration of the student of folklore and primitive belief. The Dusun, however, are animists, and their folk tales are peculiarly interesting from more than one point of view. One feature in their beliefs is the cult of the Sacred Jar, with its elaborate ritual, which has been held to support the view that there is a Chinese element in their culture, though with this Mr. Evans would not agree. The jars themselves are old and mostly of Chinese origin. Much of the religious ceremonial of the Dusun, such as the annual expulsion of evil spirits, the agricultural ritual, and the taking of the rice soul, are of a type familiar to readers of the "Golden Bough." Most interesting of all, however, are the folk tales collected in the Tuaran and Tempassuk districts. They provide a wealth of material for comparative study, but above all, they give a most illuminating insight into the life and culture of a not unattractive race. Turning to the section which deals with the Malay Peninsula, it may be said at the outset that the author himself regards these papers on the one hand as no more than supplementary to Skeat and Blagden's "Pagan Races of the Malay Peninsula," and on the other as additions to Skeat's "Malay Magic." In the case of the Pagan Races, the Sakai, Semang and Jakun, he points out the pitfalls which beset the observer who attempts to define the differences which distinguish the three groups. This is due to the difficulty of getting into touch with them and our consequent lack of detailed knowledge of their beliefs. As an instance he points to the fact that while Skeat says that Negrito religious ideas show little fear of ghosts and few or no traces of animistic beliefs, his own experience goes to show the exact contrary. In dealing with the Malays proper, Mr. Evans gives some disconnected notes on customs and beliefs, interesting, but not of great moment, and some attractive folk-tales, one of them an entertaining version of counting your chickens before they are hatched, on the lines of the familiar story of the milkmaid who lost her milk while dreaming of the fortune she was to make out of its sale. Other papers deal with Malay Back-slang, the ceremony of setting up the posts of a Malay house, Bêla Kampong—the annual ceremony to avert misfortune—and the customs and tabu language of the camphor hunters. E. N. FALLAIZE.

Meteorology. A. E. M. Geddes. 390 pp, 22.5 x 14.5 cm. Many illustrations. Blackie and Son, 1921. 21/-.

This text book aims at setting forth the principles underlying the study of the weather and the methods used in that study, leaving to such a book as Kendrew's "Climates of the Continents" the question of the application of those principles to the interpretation of observations in the various regions of the world. Indeed, it is a pity that the author does not leave that duty still more completely to others, for every geographer who has read Kendrew and Sir Napier Shaw's "The Air and its ways," will find that Geddes' short and out-of-date account of monsoons had far better have been left unwritten.

The introductory chapter is on the utility of meteorology and the story of its progress as a science from the earliest times to the recent discoveries of the importance of the stratosphere (upper zone of the atmosphere). The atmosphere and problems of radiation are then dealt with, and successive sections touch temperature, pressure, water vapour, the minor circulations of the atmosphere, the free atmosphere as investigated especially by ballons-sondes; atmospheric electricity, optics, and acoustics; and finally weather forecasting. There are some clear and striking photographs of types of clouds, including a view of the upper surface of strato-cumulus clouds as seen from an aeroplane, and there are also coloured plates showing solar halo, lunar corona, zodiacal light and purple light. The book gives statements as to the various theories on cyclones, and so on, and is useful on that account, but the value of the book would have been much increased had the writer given more adequate references to bibliography in order to help the student on his way. This is a matter for attention in a subsequent edition, as is also the need for revision of several references to climates of various regions.

China in the Family of Nations. Henry T. Hodgkin. 19 x 12½ cm. 267 pp. George Allen and Unwin Ltd., 1923. 7/6.

The object of this important and timely book is explained in its dedication to Chinese students in Britain, " in the hope that it may help my fellow-countrymen to understand some of their feelings and aspirations, and so to seek for a national policy towards China animated by respect, the spirit of fair play, and intelligent sympathy." Its author is a distinguished member of the Society of Friends, a body which in recent years has done much to promote international understanding. He was for some time associated with the great co-operative enterprise which produced the Union University of Chengtu (West China), and more recently he has devoted himself to an intimate study of the vast problems involved in the industrialisation of China. Alike by training, experience, and temperament, he is admirably qualified for the task of giving to western students and teachers a real insight into the Chinese situation, which happily so many are now trying to understand.

Mr. Hodgkin begins with a sympathetic summary of " The Treasures of the Past " in China, the historical setting of her great civilisation, and the contribution of her thinkers. In the course of an interesting commentary on the teaching of the Chinese Classics, he remarks that while Chinese thought as a whole has not looked to any supreme revelation of God in a Person nor clothed Him with personal attributes, " it has patiently sought to understand the words that He has spoken in the book of nature, in men's relationships with one another, and in the deepest recesses of the human heart." The book throughout is dominated by the author's conviction that the future of world civilization must turn on the character of the synthesis to be made between western and oriental experience. In an illuminating final chapter on " China's Gift to the World," Mr. Hodgkin indicates what he believes this synthesis is capable of becoming. The following passage, which summarises his own standpoint, deserves quoting in extenso:—" The new synthesis is being worked out in some far greater way than any of us can see. The West brings its doctrine of individualism based upon a conviction that Heaven is no impersonal force or blind destiny, but a creative, loving mind, one who can truly be called our Father. China brings her massive social philosophy, a system representing the last word of the East on the principles which should bind men together in a living bond of responsibility and service. From the deeper blending of these two strains of thought, who can tell what may be born? Mazzini's words come with peculiar significance to the student of this wondrously interesting problem. ' Life is one; the individual and society are its two necessary manifestations; life considered singly and life in its relations to others. Flames kindled upon a common altar, they approach each other in rising, until they mingle together in God.' "

In chapters III and IV Mr. Hodgkin traces the evolution of contact between the long-isolated civilization of China and that of the West in order to explain the genesis of the modern problem. The initial phases—" Early International Relations "—are necessarily passed over very rapidly, and students of historical geography should supplement the little that he has to say about the cultural relations of Early China by reading the admirable article on " The Development of Chinese Civilization " by Carl Bishop in the AMERICAN GEOGRAPHICAL REVIEW (January, 1923). The middle chapters of the book are devoted to a careful examination of the development and efforts of the western policy of economic imperialism in China, and this enables Mr. Hodgkin to put in its proper setting the rise of industrial and imperialist Japan and her attitude towards China. The discussion of the whole complex question of East-West trade relations is necessarily coloured by the author's view that the West had no justification for forcing foreign trade on China, and if the reader feels that he needs a corrective he can refer to Morse's standard work on " The International Relations of China." But Mr. Hodgkin's analysis is in the main essentially just and well-proportioned, and the summary in chapter vii of the stages by which economic imperialism, acting upon the weak points in the Chinese armour—her lack of political cohesion and the low standard of public service—has led up to the present situation, deserves close study. The criticism of Japan is discriminating and balanced. Mr. Hodgkin asks us to remember that there are three Japans—a militarist, imperialist Japan; a conservative, constitutional Japan; and a progressive, pacifist Japan. In the co-operation of the last with the best elements in young China, Mr. Hodgkin sees one of the chief hopes for the peace of the Far East.

There follows a particularly valuable chapter on the industrialisation of China. The author has had exceptional opportunities for studying this vital aspect of modern China, the gravity of which is far too little understood in England. He brings into clear relief the magnitude of the change in the whole structure of Chinese life which the process of industrialisation threatens to produce, and points out that as the West was mainly responsible for the creation of this problem and must share in the general misery if things go badly wrong, it behoves us to give of our best in helping China to its solution. He has some interesting remarks to offer on the possible adaptation of the Chinese social system to the needs of modern industry—the development of an industrial democracy on a voluntary basis preserving the essentials of Chinese social solidarity.

It should be noticed that Mr. Hodgkin inclines to accept the estimate of Chinese mineral resources made by Mr. Ting, director of the geological survey of China, which places them at an almost incredibly lower figure than that given in the current text-books of economic geography. The survey's estimates, however, are admittedly very conservative, and it is at any rate certain that China has enough coal and iron of the highest grade to dominate the mineral situation in the Far East, and to provide the basis for vast textile, metallurgical, and other industries.

No less interesting is the chapter on "The New Thought Movement." This finds a parallel in other countries, but the traditional Chinese reverence for learning, the absence of class distinctions, and the close contact of the student body with the mass of the people, give it special importance in China. The reviewer has seen enough of this remarkable movement and of its wide-spreading influence to know that Mr. Hodgkin is right when he contends that the group of young men who are directing it are primarily inspired by the desire "on the one hand to discover the inner secrets of western strength, and, on the other, to bring out the deepest meaning in their own philosophy, and so to effect a new synthesis on the intellectual and spiritual plane. They have set themselves the task not of copying the West here and the East there, but rather of creating a new thing through a deeper appreciation of all that is best in both." The movement is faced with herculean difficulties, and some aspects of it are open to serious criticism, but it is unquestionably one of the most hopeful and constructive forces in the modern world.

This is a book which probes to the core of the Chinese problem, and can be strongly recommended to all students of the wonderful drama now being enacted on the Far Eastern stage.
P. M. Roxby.

1. **The Tragedy of Central Europe.** E. Ashmead Bartlett. 23 x 14 cm. 316 pp. Thornton Butterworth, 1923. 21/-.

2. **Dismembered Hungary.** Ladislaus Buday. 19 x 13 cm. 286 pp. Grant Richards, 1923. 6/-.

3. **The Evolution of Hungary and its Place in European History.** Count Paul Teleki. 20 x 13 cm. 312 pp. Loose folder ethnographical map. Macmillan, 1923. 16/-.

These three books are indeed a sad commentary on the difficulties that are besetting post-war Europe. The first is an attempt by an Englishman who went out on behalf of "The Daily Telegraph" to describe events and peoples and principles as they seemed to him during his visit in 1919. Naturally everything is coloured by the author's own very strong personality and very vivid prejudices. It is rarely that he gets back to the real first principles which underlie the distress he sees, though in his comments on the system of exchanges he rightly draws attention to the anomaly and injustice of many international economic processes. Few folk who earnestly hope for the future peace of Europe will read his last chapter without a shudder, both at the tragic conditions it discloses and also at the pitiful point of view which considers it "hardly worth while thinking of the possibilities of the future," since world peace is as far off as ever, and yet does not hesitate to impute future greed and war spirit to all European nations. The second is by the Professor of Statistics in the Buda Pest University of Technical Sciences. It sets out to give statistics and tables which shall illustrate the present dire situation of Hungary, but alas! it sets out to give them as an illustration of the political belief of the author that all these distresses are due to dismemberment. And what more impossible task could be set a patriot than to be entirely impartial in such a matter? The third book is by the Professor of Geography at Budapest University, and has one enormous advantage over the other two; it has a full and well classified bibliography extending over nearly sixty pages, which should prove invaluable to students. He attacks the problems with a clarity of insight to be expected from so distinguished a scholar, and on page 171 he hits upon the root cause of the exceeding ease with which each side in a "nationality" struggle can bring forward the most impressive statistics and maps with an entire belief in their validity and practical applicability, though those two sets of statistics and maps are utterly discordant one with the other. He asked a prominent Czech politician how it was that he gave the number of Poles in the Teschen area as perhaps 40,000, perhaps 100,000. The reply was, "Well, the figures change. The people of certain villages are changing their nationality every week, according to their economic interests, and sometimes according to the economic interests of the mayor of the village." One is left with a much more hopeful feeling about the possibilities of returning sanity in the future when one has read the author's thoughtful summary of the Nationality problem. The following quotation shows the spirit of the book:—"Finally, the right settlement can be no other than the scientific solution. Instead of talking so much of nations and races, and thereby stimulating racial hatred . . . . . . let us rather study life." And he goes on to say that Russian farmers and Hungarian farmers were possibly more closely drawn together by the identical form of their hoe than by many a political argument!

L' Ile Percée. J. M. Clarke. 203 pp, 23.5 x 16 cm. Map, 8 plates, numerous illustrations. Yale and Oxford Univ. Press, 1923. 12/6.

Professor Clarke, in studying the structure of the peninsula which bounds the St. Lawrence mouth on the south, has been much drawn to the romantic memories of this little piece of American France, and has written this pleasant book, which tells us simply not only the structure of Gaspé between Chaleur Bay and the Shickshock Mountains overlooking the St. Lawrence, but also the origins and characteristics of its people. Even those who have not read the great books of Francis Parkman cannot but be attracted by this region sacred to the memory of Jacques Cartier and the French pioneers, and preserving to our own day, in spite of Anglicisation, a great deal of the inheritance it acquired from France and the Channel Islands, and from the blending between French and American Indian under the influence of the Church. Prof. Clarke emphasises the English difficulty to apprehend the American Indian in any of his relations to civilized society, and quotes with approval Parkman's statement that French civilization embraced and cherished Red Skin, adding that the Catholic Indian, taught by the French missions, is truly a Catholic, whereas the Protestantism of the American Indian is rarely more than skin deep. A speech delivered in 1805 by an Indian chief is given in extenso, and is food for much thought.

The little old-world communities of Gaspé are treated in interesting fashion, and we are given a picture of French pioneers making homes in this new and most Catholic France, and then of the passing of suzerainty to Britain, followed by the enterprise of the Channel Islanders in founding fishing companies (the Charles Robin Company is a notable case in 1766), helped by their knowledge of both languages, but English in that they were keenly Protestant. The final stage is that of modern, but still incomplete Americanisation. The fisheries were close to the shore, and the product mainly cod to be split and salted and dried for Lenten fare, and provisioning of armies, in Europe; this export trade is reduced nowadays, but 40,000,000 are still fished up each year.

The structure of the country we glean here and there. The crushing of the less resistant rocks of the south against the resistance of Labrador, has led to the great breakdown now filled by the St. Lawrence, and to folding of which we see the remains in Gaspé, the sigmoid curve being very conspicuous in feature after feature on an orographical map. The mountain-making epoch which made the older highland here was the Middle Devonian (Lower Devonian is caught in the folding). The Appalachians further south have carboniferous rocks caught in the folds and are a good dealt later, the Gaspé folds belong to the Caledonids of the geomorphologists, and their appearance has been much affected by a later subsidence and an edgewise cover of conglomerate. Often elsewhere in Appalachia the old fold-tops have become valleys and the old synclines remain as highland, and the same thing occurs in Wales, for example, but Gaspé Bay, Malbay, and their river systems are still the old synclines between the original mountains. Truly Gaspé is in many senses a land of the past, and Prof. Clarke seems a rare guide to its secrets.

The Sikhs of the Punjab. R. E. Parry. 128 pp, 19 x 12 cm., illustrated. London: Drane's, 1921. 5/-.

This is an interesting little book by a young British officer who has obviously gained a good deal of knowledge of the Sikhs while recruiting amongst them and performing various military duties. He writes with evident interest in and great appreciation of the people, and the little book gives a very fair picture of local life. Mr. Parry was a student under Professor Lyde, and shows the results of his training to advantage in his references to agriculture and products of the area, while the discussion of climate seems good, though here and there unnecessary references are dragged in. The Sikhs, he tells us, are an order of military Hindu dissenters, and admission is obtained only through ceremonial baptism, and not by birth. Some parts of the book are occupied with accounts of the author's experiences, and these are in some cases well selected to give an insight into rural life in the Punjab.

Die Kunst der Primitiven. H. Kühn. 246 pp, 27 x 19.5 cm., 215 figs. 1923. Delphin, Verlag, München.

This is a richly illustrated work that sets forth, side by side, the arts of both prehistoric and historic antiquity and the arts of many nature-folk the world over. The illustrations are often full page, and many are coloured. The Art of the Palæolithic is treated very briefly, as other treaments are easily available, and the facts are then used, as need arises, in the rest of the book. Bushman Art, for example, is compared with Mesolithic (transition from Palæolithic to Neolithic) Art, and so on. The art of the nature peoples is treated regionally, and this is a valuable point for us geographers. The text is serious, and discusses relationships of intercourse between various peoples. It is a book for all those who realise that the life of the nature-folk should be esteemed as something more than savagery, to be cleared away at the earliest possible moment by contact with industrialism. There is a massive bibliography of the utmost value, and made more easy of reference by the fact that it is carefully classified under sub-headings.

Children of the Sun. W. J. Perry. 551 pp and maps. 23 x 15 cm. London: Methuen, 1923. 18/-.

This book is dedicated to Professor Elliot Smith, whose interesting and courageous theory of migrations of culture is so much debated, and debated with increasing, partial, agreement. The older attitude led men to think that the main facts of the world's cultures, outside the areas of recognised communications, had evolved mainly as a result of inter-relations between man and environment *in situ* without commanding influences from outside. Resemblances in social facts in different regions were looked upon as the natural consequences of the working out of human instinct, and such parallelisms were only occasionally and under special circumstances used as evidence of contacts between the peoples who exhibited them. Dr. W. H. Rivers, in his "History of Melanesian Society," broke away from this point of view, and urged the importance of historical contacts as hypotheses for interpreting resemblances. Professor Elliot Smith carried this idea to great lengths when he suggested widespread influences of ancient Egyptian civilizations as factors which had helped to mould culture in Indonesia, Australasia, Polynesia, and America, as well as Eurasia. Dr. Clark Wissler, one of whose books is noted above, upholds the view that all we find in native life in America is truly native, but several archæologists find it difficult to agree with him; resemblances in some cases are so numerous and so detailed. Mr. Perry is a pupil and colleague of Professor Elliot Smith, and he develops the idea that a whole culture complex spread out with the practice of agriculture from Egypt, and that in many regions we find partly degraded remnants of culture elements the meaning of which has been forgotten by the peoples to whom they were taught. The idea of culture-in-degradation is a most important one, and this school is undoubtedly right in insisting on it. It remains to be seen whether the idea of Egyptian origins is as generally applicable as this school claims. Perry argues in this book with the help of distribution maps, which are of great interest to say the least. Those of us who have tried to make distribution maps will know how difficult it is to map archæological data accurately even for W. Europe, and will appreciate the author's effort to give maps which can at least serve as bases for constructive criticism. For the purposes of the student of geography the main thesis is far more important than are its special applications, and it is this main idea that the present review attempts to set forth.

Philips' Visual Contour Atlas. Central Wales Edition. 18 x 22¾cm. G. Philip and Son, 1923. Price, 1/6 net.

This latest addition to Messrs. Philips' useful series of editions of cheap atlases for schools gives four pages, as usual, to maps of the district concerned. An orographical map (1 in=6 miles) of Cardiganshire, Radnorshire, North Brecon, and most of Montgomery, covers two pages, one page is given to an orographical map of Wales and the border counties, and one page has a geological map of Central Wales specially prepared from original resources by Mr. R. M. Jehu, B.Sc., University College of Wales, Aberystwyth. This is a new map, and an interesting substitute for the erroneous old maps which have done duty for so many years. The completion of the geological survey of the area concerned formerly prosecuted by Prof. O. T. Jones, is now going ahead under Prof. W. J. Pugh. Mr. Jehu is one of his students, who is himself contributing to this research. The place names in the Welsh maps of this atlas are open to a good deal of criticism, but the subject is admittedly a difficult one.

The Recession of the last Ice Sheet in New England. Ernst Antevs, with a preface and contributions by J. W. Goldthwait. American Geographical Society Research Series, No. 11. 21 x 13 cm. 1922. 120 pp.

Dr. Antevs is a disciple of Baron Gerard de Geer of Stockholm, whose genius led to the discovery of a "simple, graphic way to correlate layers of clay at one locality with the layers at another locality, and thus to identify them as the record of the same years." Students interested in the pre-history of Europe will know what a great step forward in the study of the evolution of climate, and the migrations of plants, animals, and primitive man, was made as a result of the studies of de Geer and his colleagues. Dr. Antevs has brought the method to bear on the problems of New England glaciology, with some very striking results, and his book is valuable not only as a study of that particular regional problem, but also as one of the few exact and detailed descriptions of the method as yet accessible to English readers. The study is of immense scientific value, and Dr. Antevs has been able to demonstrate that there are data for records of 4,400 consecutive years during the retreat of the latest ice sheet. Unfortunately, however, there is not sufficient correlative evidence to fix the actual place in time of those 4,400 years. There is a fine coloured folder map of the glacial phenomena of New England and New York, prepared by Professor Goldthwait, and there are several sketch maps showing the position of the sections. The photograph of an exposure of varve clay, looked at in conjunction with the diagram showing the manner of its deposition (page 2) is a practical demonstration of the method, and the careful description of the sections at the localities studied is an object lesson in exact and patient scientific research.

The Races of England and Wales: A Survey of Recent Research. By H. J. Fleure, D.Sc. London: Benn Bros. 1923. pp. 118. Price 5/- net.

In all scientific investigation it is highly desirable that the worker should from time to time step back, as it were, from his work, and endeavour to take stock of it as a whole. This is particularly the case in such a subject as ethnology, which in recent years has made great strides both by the acquisition of new facts and, more particularly, by the revision of theory in the light of new facts. Professor Fleure's little book is therefore welcome as an indication of the stage which has now been reached in the solution of the ethnological problems which affect this country. It has appeared at a moment when these problems are much debated, and the student stands in need of some such trustworthy guide to principles and lines of investigation as is provided by Professor Fleure both here and in his previously published volume on the "Peoples of Europe."

At the outset he points out that by race-types is meant groups of associated characters—head form, pigmentation, bodily dimensions and the like—which are continually being sorted or re-sorted, and even now are subject to modification, rather than "breeds" which have kept separate since their first evolution. This way of looking at the ethnological problem should be kept in close association with the conception of "descent with modification," which Professor Fleure expounds later in the book, by which the fully fledged type, Nordic, Mediterranean, and so on, is regarded as the *terminus ad quem* rather than *a quo*. This essentially dynamic view of the ethnological problem will provide the student with a key to many of the puzzles he will encounter when he begins to apply his theoretical knowledge to actual observation. Anthropologists never tire of declaring with varying emphasis that "no pure race exists," yet, unless it be kept in mind that in a modern community the associated characters which are regarded as indicative of race are continually being sorted and resorted as a result of intermixture, there is a great danger that ideal types such as "Mediterranean," "Alpine," and "Nordic" may become meaningless abstractions and as dangerous and misleading as the journalistic use of "Latin" and "Celtic," which Professor Fleure rightly condemns.

It is unnecessary for the purpose of this notice to follow Professor Fleure in detail in his account of the various racial strains which have been introduced into these islands in the Neolithic, Bronze, and Iron Ages, and in later times. It is both accurate and sound, while the review of the characters of the present population, so far as our data go, is probably the best summary available in a small compass. E. N. FALLAIZE.

Highways and Byways in Dorset. Sir Frederick Treves.
Highways and Byways in Surrey. Eric Parker.
Highways and Byways in Devon and Cornwall. Arthur H. Norway.
Highways and Byways in Oxford and the Cotswolds. H. A. Evans.
Highways and Byways in Sussex. E. V. Lucas.
Highways and Byways in Kent. Walter Jerrold.
Macmillan and Co. 6/- each vol.

We have received from Messrs. Macmillan the above series in a new edition, 17.8 x 11 cm., charmingly illustrated, and small enough for the traveller to carry conveniently in a fair sized pocket. Those who are familiar with the various previous editions of these books will welcome the possibility of reading in situ the many interesting sidelights on local life, past and present. Teachers who want to study in detail any of the above counties for regional survey work would do well to get the books. The folder maps vary very much in quality and usefulness, but the teacher can supplement them with O.S. maps. A copy of the Highways and Byways Book for the school district should be a part of the equipment of every school.

The Travels of Fa-hsien. Re-translated by H. A. Giles. 18 x 11 cm. 96 pp. 1923. Cambridge Univ. Press. 5/-.

This little book by Professor Giles is most welcome and opportune. The work of Stein, and of Kurita and Chavannes before him, has rendered possible geographical identifications of the route travelled by this ancient Chinese enthusiast for the things of the spirit. Fa-hsien set out from Central China and travelled across the Desert of Gobi, over the Hindu Kush, through India down to the mouth of the Hoogly, and home by sea, in an endeavour to secure for his native land the books of the Buddhist canon. The present translation has the advantage of the accuracy gained from the errors of previous translations, and is written in a style which brings out the charm of this most delightful record of a pilgrimage. The descriptions of the sufferings undergone by the pilgrim and of the places he visited are very vivid, and are of first class importance to the geographical study of the region. The book should be on the shelves of every library for upper forms. A useful map, with the ancient names, is included in the book as an end-piece.

Angkor: Ruins in Cambodia. P. Jeannerat de Beerski. 14 x 23 cm. 304 pp. Illustrations from drawings by the author and from photographs. Grant Richards, 1923. 18/-.

There is no doubt about the author's enthusiasm for these strange and little known remains of an almost forgotten civilisation. But whether the reader will be able to get the same enthusiastic belief in their wonder and beauty and in the value of the civilisation of their forgotten builders will certainly be a matter of temperament, for not all of us can enjoy a style of description so impressionistic, so obviously highly coloured by the writer's own imagination, and so mixed with excursions into philosophy and ruminations on subjects entirely unconnected with Cambodia and its past. Yet there is a good deal that is of value to archæologists to be gleaned from the book and its illustrations. The author's drawings are most charming and effective, and are a welcome change from the dead certainty of the photograph, as far as interest goes. But perhaps it is permissible to wonder whether the delightfully knowing facial expressions in many of the sketches do not owe a good deal of their charm to M. de Beerski's skill. Some of the most fascinating descriptions in the book, and, it may be added. the most valuable for the student, are those of the daily life of these folk of long ago, as suggested to the author by a study of their carvings, and the sketches illustrating the life of the commoners are particularly happy. Students of folk lore would have enjoyed the legends with which the book is plentifully sprinkled much better had references been given. The lack of bibliography and index is a decided drawback.

The Physiography of the McMurdo Sound and Granite Harbour Region. Griffith Taylor, D.Sc. British Antarctic (Terra Nova) Expedition, 1910-13. London: Harrison and Sons. 1922. 25/-.

This is one of the volumes of the scientific results of Captain Scott's last expedition. It covers the work for which Dr. Taylor was chiefly responsible. To physiographers it is a volume of great importance. Teachers will find its chief value in its superb illustrations, for it goes too deeply into a limited area for any but the expert to be able to make use of it. The few notes on sea-ice and icebergs might well have been added to the fine monograph on glaciology by Messrs C. S. Wright and R. E. Priestley, recently published in the same series. From the evidence he collected Dr. Taylor feels sure that Antarctic glaciers are doing very little erosion at present, whatever they may have done under different conditions of glacerisation in the past. And since Dr. Taylor is a physiographer who brought to this region a wide experience of other parts of the world, his opinion is entitled to great weight. The volume might be concurrently studied along with that of Prof. T .W. E. David and Mr. R. E. Priestley in the results of Shackleton's Antarctic Expedition of 1907-9 (Geology 1), which touches the same part of Antarctica, now the best explored part of the whole continent. Dr. Taylor's volume is characterized by his usual forcible style, certitude of opinion, and partiality for coining new and useful, but often uncouth forms. But he never fails to be interesting nor lacks lucidity. There are several beautifully executed maps. R.N.R.B.

The Blue Guides. Switzerland, with Chamonix and the Italian Lakes. 16x 10 cm. 512 pp. Edited by Findlay Muirhead. Macmillan. 15/- (also in an edition in 3 volumes, separately indexed, prize 18/-).

The returning facilities for travel on the continent make this addition to the guide book series very welcome. The introductory chapters on the history and art of Switzerland with the addition of a short list of books might with advantage be expanded in a future edition, and while it is good to see such books as Freshfield's "Below the Snow Line" and Sir Martin Conway's "The Alps from End to End," we feel that some reference to the source books for the study of Alpine lake villages and Alpine glaciology would have been useful in view of the numbers of students and teachers who visit Switzerland. The practical information given is good and helpful, though, of course, data as to hotels and accommodation is always liable to need correction, amplification, and verification, since personnel changes. The book is of a handy size for carrying, and the maps are clear, and give, as a rule, most facts that the ordinary traveller needs.

Geography of British Honduras. A. B. Dillon. pp 39 and folder map; 19 x 12 cm. 1922. 1/-. Pub., Crown Agents for the Colonies.

This is a useful little compilation by an inspector of schools in British Honduras, and it may well be of use to teachers elsewhere who need something more than the inevitably bare summaries of the "Statesman's Year Book." The colony's present products on a large scale are bananas, plantains, and coconuts, as well as tropical woods, and are sent mostly to U.S.A., but some to England and elsewhere, after having been collected to some extent from the neighbouring countries, so that the colony acts an entrepot.

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Full particualrs of courses, fees and regulations will be supplied on application to the College Registry.

Philips' Visual Contour Atlases. Local Editions. 23 x 19 cm. 1/6 each, except Newcastle, which is 1/9.

Each atlas includes 4 pages of local maps, a page illustrating the scales of ordinary maps, and 39 pages of other maps generally orographically coloured, sometimes with political colouring alongside the orographical. An index of place names follows, and the back cover has a list of the principal countries of the world on one side, and in some cases a short summary of information about the locality of the edition on the other. The general matter is the same in all the editions, and is reasonably chosen for its purpose. The local matter includes one or more orographical maps usually with an administrative map, and so on. The Bedfordshire, Dorsetshire, Lancashire, Middlesex, and Monmouthshire editions are all as above, the Bolton edition has an additional map in black and white of the Bolton district. The Blackburn, Wallasey, and Crewe editions have similar local maps in black and white, but, in place of local information, have a discussion of map-projections on the back cover. The Bradford, Cheshire,, Hampshire, N. Lancashire, S. Lancashire, Leeds, Staffordshire, Stockport, and Sussex editions all follow the general rule, with the summary on map projections at the end. The Central Wales edition has an interesting new map of the geology of the area as surveyed by Professors O. T. Jones and W. J. Pugh and their students. This map is the work of Mr. R. M. Jehu, M.Sc., whose researches have contributed to its upbuilding. The Newcastle edition differs from the others in the selection of maps. One page gives an orographical map of the Newcastle district and another of Great Britain and the eastern shores of the North Sea, while a double page orographical map of the Mediterranean is also inserted, evidently at the request of local teachers. We hope teachers in various districts will keep in touch with this interesting venture, so that it may develop to meet their special needs.

1. The Air and its Ways. Sir Napier Shaw. 27 x 18½ cm. 237 pp. Cambride Univ. Press. 1923. 30/-.

2. Hurricans and Tropical Revolving Storms. M.O.220i. 31 x 25 cm. 333 pp. 1922. 12/6.

Following on a period of destructive criticism which resulted mainly from upper air discoveries of some fifteen years ago, constructive work on the meteorology of the globe is being done, and a new edifice is rising on the ruins of the old. Much both of destructive criticism and of constructive work has been done by Sir Napier Shaw. "The Air and its Ways" is not a formal treatise but a collection of papers written on various occasions and dealing with various aspects of this work and criticism. The volume shows the subject of meteorology in its workaday clothes, with loose or missing buttons here and there, and the tailoring not always perfect. The subjects of which the papers treat are very varied, but they form delightful if somewhat perplexing or even disturbing reading. There is a unity in this volume as there is in all of Sir Napier's work, but his very freshness of mind, which we all envy, makes him emphasise diifferent aspects of the truth at different times to such an extent that they may even seem opposed, while Sir Napier is not at all ashamed to change his opinions frankly when there is good and sufficient reason. It is one of the charms of this book that one is allowed to see the workings of such a mind.

Needless to say it is a book which every serious reader of geography ought to look at; such a one should certainly digest some of the more important papers. That dealing with the "Weather of the World" probably still remains the best outline account for schools of pressure distribution on the world and of associated wind systems, but it should be supplemented by paper 8, "The structure of the atmosphere up to 29 kilometres." One of the most important and controversial papers is called "The cyclonic depressions of middle latitudes." It deals with the mode of formation of cyclones. No one has opposed the traditional convective explanation of cyclones with such destructive effect as Sir Napier, but he has never ceased to insist on the fundamental importance of convection. "There is nothing but thermal convection to act as the motive power for every spot of rain that ever fell and for every wind that ever filled a sail or wrecked a ship since the world began." So we have now a new and very valuable suggestion on the origin of cyclones which utilises convection, but appears to eliminate some of the obvious errors of the older explanation. It carries the discussion a stage further, but it has met with a good deal of adverse criticism, and it cannot be said that it is yet accepted.

In the introduction to "Hurricanes and Revolving Storms," Sir Napier deals with the birth and death of cyclones, and throws some further light on this very vexed question. Much still remains to be done, but one is now beginning to see some order emerging out of the chaos of the past few years. J.F.

Eastern England. An Economic Geography. J. Bygott. George Routledge and Sons, 1923. Pp. xv + 358. 19 x 13 cm. 6/-.

Dealing with an area which includes much of Lincolnshire, Norfolk, Suffolk, Essex, Cambridgeshire, and Huntingdonshire, this book presents a study of a region which is mainly agricultural, and thus in strong contrast with the industrial areas examined by Mr. Ll. Rodwell Jones in his " North England," which belongs to the same series. The author anticipates, in his foreword, any criticism that can fairly be made. Limited by the nature of the publication, he presents his material in the form of a series of essays, beginning with a broad survey of the region and its main physical features. Further elaboration is confined to " type " studies, and the Fenlands and the Lincolnshire Wolds are examined as lowland and upland studies respectively. The coastal areas, the ports, the agriculture and the population are treated fully in their geographical aspects, and the agriculture of Lincolnshire, a county which lends itself admirably to subdivision, is subjected to a more detailed examination. The avowed object of the book is to " make the physical bases of Geography the foundation for explanations and conclusions," and the writer never loses sight of this object. He traces, perhaps on occasions in too great detail, the factors entering into the choice of sites for settlement, the growth and decay of industries and ports owing to changes in space relations, and the past and present distributions of the various activities of the region. The fifty-five diagrams and sketch-maps which illustrate the book constitute a very valuable addition, although the population maps of Lincolnshire (figs. 48, 49 and 50) are of doubtful value for comparative purposes, and scarcely justify the work and ingenuity involved in the adaptation of official statistics to the modified dot system of representation employed. One feels that Mr. Bygott has here a collection of material which could be incorporated to greater advantage in a regional monograph, but even in its present form it constitutes a work that no teacher or student can afford to ignore. H.K.

Vault of Heaven. Sir Richard Gregory. 19½ x 12½ cm. 202 pp. Methuen and Co., 1923. 6/-

This book was first published in 1893, but astronomers have discovered much since then, and the present edition has been so largely re-written and brought up to date both in text and illustration that it is practically a new book. To geographers it is probable that the chapter on the sun will be of most use professionally, but though the volume is comprehensive, it is written so simply and lucidly that the book will be read as a whole. The facts set forth are extraordinarily striking. One quotation from the late Prof. C. A. Young must suffice: " If we could build up a solid column of ice from the earth to the sun two and a quarter miles in diameter . . . . , and if then the sun should concentrate his power upon it, it would dissolve and melt, not in an hour, not in a minute, but in a single second." After reading the book one is left with a curious impression, obtained after study of other subjects also, of the greatness and littleness of man. Our little world is only an infinitesimal part of the universe we know, a universe some 300,000 light years in diameter, yet man has been able to fathom the depths of that universe. One is intrigued, too, by the fact that our solar system appears to be near the centre of this universe and by the suggestion that it may be exceptional if not unique.

The M.G.C. Manchester Year Book, 1923. 159 pp, 18.5 x 12.5 cm. 2/6.

This is partly a directory of business men and firms, but the high standing of the Manchester Guardian Commercial assures us that there is much more in this little volume. A note on Modern Manchester by W. H. Mills will be read with interest for its view of social conditions, past and present. The review of the present state of the cotton trade shows that Holland is the best customer for grey cottons, India is next but takes more bleached and dyed goods, Germany comes third. The cotton statistics will interest the economic geographer deeply, as will most of the book, though the directory section is inserted for a different public.

A Wanderer in Holland. E. V. Lucas. 20 x 12½ cm. 10/6. Methuen. 18th edition, revised.

The fact that this charming guide to Holland has run into 18 editions since 1905 speaks for itself. There are twenty illustrations in colour and thirty-six illustrations taken from the work of the old Dutch masters. It is an interesting sign of the general agricultural tendencies of the century that Mr. Lucas comments on the striking increase of activity in intensive gardening outside the great cities as being the only marked change in Holland during the last seventeen years.

The Spirit of the Downs. Arthur Beckett. Methuen. 19½ x 12½ cm. 8/6. 3rd edition. 12 photograhs and an end paper map.

Lovers of the Sussex Downs will welcome a new edition of this interesting and pleasantly discursive study of their scenery, history, archæology, and folk lore.

Geography of Commerce and Industry. R. S. Bridge. Hodder and Stoughton. Second Edition, 1923. Pp. viii + 264. 4/6.

This book belongs to the well known New Teaching Series, and discusses the natural resources, industries and commerce of the most important regions of the world separately in relation (a) to the great oceanic and continental trade routes, and (b) to the world as a whole, regarded as an economic unit. The general plan of the book is excellent, and the lessons, together with the exercises at the end of each chapter, should form a very comprehensive three years course. The second edition is virtually a republication of the first edition, and has been altered only in detail. The writer's remarks on the manufacture of iron and steel (p. 130-131) have been somewhat expanded, and the error made in the mileage of the North Eastern Railway (p. 117) has been rectified. The chapter on railways has been recast in the light of recent amalgamations, and the diagrams have been more neatly executed, but still remain "rough," in that there has been no attempt to correct distances between the towns shown. Thus on the diagram on p. 217, Cairo appears to be nearer to Memphis than to St. Louis, whereas actually the opposite is the case. However, the writer is deliberate in his persistence in this particular form of diagrammatic representation, and after all it is merely a point of view. There are still many omissions. One would expect Warrington, for instance, to be classified on p. 141 at least as an important soap producing town, although it certainly has been somewhat eclipsed by Port Sunlight in this respect. Perhaps this edition suffers most from lack of adequate consideration of post-war territorial changes in Europe. These changes are merely catalogued (on p. 178) at the end of the chapter on Europe, and cognisance is not taken of the far-reaching effects of the Treaty of Versailles and subsequent treaties on internal and external economic relations; effects which potentially might cause not merely a temporary but a permanent change in the direction of commerce in Europe. It is to be hoped that, if a third edition is ever published, these and other points will secure much needed revision. H.K.

A List of other Text Books received is appended, and teachers who are interested in their titles are invited to write to the publishers.

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(1) **The Home of Man. Part 2, Europe.** W. C. Brown and P. H. Johnson.
G. G. Harrap and Co., 1923. Price, 2/6.

(2) **The Progress to Geography. Stage 5. Britain and Europe.** Richard Wilson.
Macmillan and Co., 1923. Price, 4/6.

(3) **The Progress to Geography. Stage 6. Britain and the Modern World.** Richard Wilson.
Macmillan and Co., 1923. 4/6.

(4) **The Rambler Travel Books. The Americas.** Lewis Marsh.
Blackie and Son, 1923. 1/4.

(5) **Travellers' Tales.** Published by Edward Arnold. 2/6.

(6) **The Story of Early English Travel and Discovery.** A. Waddingham Seers.
G. G. Harrap, 1923. 2/6.

(7) **Britain and Her People.** G. O. Turner.
McDougall's Educational Co. 3/-.

(8) **The World's Storehouses.** E. L. Bryson and K. A. Cameron.
McDougall's Educational Co. 2/2.

(9) **The Oxford Picture Geographies. Mountains and Plains.** H. McKay. 8d.
(10) ,, ,, ,, **Rivers.** H. McKay. 8d.
(11) ,, ,, ,, **The Coast.** H. McKay. 8d.
(12) ,, ,, ,, **Text-Book 1. Mountains.** H. Mckay. 2/6.
(13) ,, ,, ,, **Text-Book 2. Rivers.** H. McKay. 2/.
(14) ,, ,, ,, **Text-Book 3. The Coast.** H. McKay. 2/6.
Nos. 9 to 14 by the Oxford University Press.

(15) **Stories and Sketches of Children of Other Lands.** N. B. Allen and E. K. Robinson.
Illustrated by M. Davis.
Ginn and Co. 2/-.

(16) **Australia, New Zealand and Oceania in Pictures.** H. Clive Barnard.
A. and C. Black. 1923. 3/6.

(17) **W. and A. K. Johnston's School Atlas.** Price, 6d.

(18) **Philips' Shilling Atlas of Comparative Geography.** G. Philip and Son. 1/-.

THE GEOGRAPHICAL TEACHER.

SPRING 1924.

EDITORIAL.

THE year that has just ended has been one of difficulty and depression in the educational world, and it is therefore all the more pleasant to report that teachers of geography have continued to make determined efforts to improve the study and teaching of their subject. New branches of the Association have been formed, including one with several hundred full and also several hundred associate members in Burmah. In spite of the fluctuations of the exchange, the branches in Ceylon and the United Provinces of India have continued their steady efforts to break new ground in geographical teaching. The affiliated Association in Ireland has also continued to work in spite of all the misfortunes and difficulties that have beset it. A branch is growing in South Africa, and there is great increase in geographical facilities there. Our colonial branches are helping to enrich our magazine, for they give us opportunities of getting contributions from geographers who are making first-hand studies of their districts. Professor L. Dudley Stamp, whose efforts led to the foundation of the Burma branch, gave us his interesting account of the Economic Geography of Burma, and we would specially call our readers' attention to the valuable illustrated study of Basuto-land, by Mr. R. U. Sayce, of University College, Pietermaritzburg, which appears in this number. Another important original study is that of the Natural Regions of Spain by J. Dantin Cereceda, to whom the Association is deeply indebted for his generous permission to the Editor to publish an English summarised translation in the "Geographical Teacher." The close contacts which Professor P. M. Roxby has made with the educational movements now stirring in China have led to great interest in the work of our Association in that country, and Dr. Coching Chu's contribution to our magazine is a concrete sign of that interest. Geographers are dependent on such links as these for the strengthening and deepening of their work, and with the increasing possibilities of expansion for our magazine we hope to develop these first-hand studies still more.

IT is another sign of the enthusiasm of our members for the raising of the standard of geographical teaching, that increasing use is being made of the more serious works in the Postal Lending Library, and that, thanks to their co-operative action, it has been possible not only to make substantial additions to the volumes on our shelves, but also to inaugurate a scheme for lending out lantern slides. On another page we print the list of gifts received during 1923 from individual members, from branches, and from friends, and it is a matter in which the Association should take great pride that the greater part of the large amount needed has been raised by very small individual contributions on the part of members themselves. The rush of requests for loans of slides already received is making it clear that our nucleus collection must be greatly increased, and we trust that members will continue to help by small donations during 1924.

NOW that geography has been recognised fully by the Board of Education, we should like to be able to take a census of all Secondary Schools in which scholars are presented for examination in geography at the First or Second Public Examination. Will all geography specialists in secondary schools please send information on a postcard (for filing) for this census to the Clerk, stating (1) Name of School, (2) Public Examination at which scholars are presented, (3) Number of scholars taking (a) their first and (b) their second Public Examination in 1924, (4) the particular Board of Education Regulation under which geography is recognised in the school, (5) names of geography teachers. We should be grateful if some member or members of the Association would volunteer to undertake the task of classifying and reporting on the replies sent.

THE Editor begs to draw the attention of teachers to the need for definite observational studies of the best methods of presenting geography to children at various ages and under various conditions. Dr. E. J. G. Bradford has published in the " Geographical Teacher " the valuable results of some of his observational work. Miss E. Winifred Jones, of Lincoln Training College, is at present carrying out some experiments on somewhat analogous lines. Will any teachers willing to take up this sort of work please write at once to the Clerk?

THE Annual Meetings of the Association were marked by the best attendance yet recorded, probably because of the special facilities granted by the railway companies. A coupon entitling members who attend the Exeter meetings to reduced rates is enclosed in this number, and members are urged to make every effort to use it. We appreciate the work of the railway companies in recognising the importance of geography as a part of a business education. We hope that other commercial firms, and especially those which make contacts with other nationalities, will follow suit. Not only have railways organised classes in geography for employees, but they are giving practical help to teachers of geography. Mr. Bell, Assistant General Manager of L.N.E.R., whose broad-minded outlook on business and on educational matters is well known, presided at one of the sessions of our Annual Meetings, and the L.N.E.R. asks us to state that it is willing to help our members by lending any of the following lantern slides, with printed explanatory matter, free of cost and carriage paid.

Set	1N.	Lincoln and Lincolnshire	61	slides.
,,	3N.	Cathedrals and Abbeys on the East Coast Route	69	,,
,,	4N.	Castle and Mansions of the East Coast Route	84	,,
,,	4E.	The Story of East Anglia. Part I	50	,,
,,	5E.	The Story of East Anglia. Part II	52	,,
,,	7N.	The Highlands and Islands of Scotland	175	,,

For loan of any of the above please apply to Advertising Manager, L.N.E.R. Southern Area, 26, Pancras Road, London, N.W. 1.

Set	A.	The Yorkshire Coast	79	slides.
,,	B.	York and the N.E. Yorkshire Dales	68	,,
,,	C.	Wharfedale, Nidderdale, Wensleydale and Swaledale	80	,,
,,	D.	Teesdale and the Lake District	68	,,
,,	E.	The Northumberland Coast	61	,,
,,	F.	Tynedale and the Roman Wall	63	,,
,,	G.	Scarborough and Surroundings	80	,,
,,	H.	Bridlington and Surroundings	65	,,
,,	K.	Durham County	82	,,

For loan of any of the above please apply to Advertising Manager, L.N.E.R. North Eastern Area, York.

Set A.	Scotland. Berwick to Aberdeen	81 slides.
,, B.	Scotland. The West Coast, Loch Lomond, and the Trossachs	71 ,,
,, C.	Scotland. The Lothians	66 ,,
,, D.	Scotland. Edinburgh to Dunfermline, Stirling, Dollar and Perth	67 ,,
,, E.	The Borderland	69 ,,
,, F.	Scotland. The Western Highlands	66 ,,
,, G.	Scotland. Fort William to Mallaig and the Western Islands	74 ,,
,, 1.	Scotland. Aberdeen to Elgin and Lossiemouth	100 ,,
,, 2.	Scotland. Buchan, Aberdeenshire	100 ,,
,, 3.	Scotland. Deeside	100 ,,
,, 4.	Scotland. Speyside and Elgin	116 ,,
,, 5.	Scotland. Dee, Don and Spey	116 ,,
,, 6.	Scotland. Aberdeen to Macduff	76 ,,
,, 7.	Scotland. Aberdeen to Alford	75 ,,
,, 8.	Scotland. The Moray Firth	50 ,,
,, 9.	Scotland. Aberdeen to Boat of Garten	50 ,,
,, 10.	Scotland. Deeside	50 ,,
,, 11.	Scotland. Aberdeen to Bodham	50 ,,
,, 12.	Scotland. Aberdeen to Inverurie	50 ,,

For loan of any of above please apply to Advertising Manager, L.N.E.R. Scottish Area, Waverley Station, Edinburgh.

In applying for the loan of any of these slides please state clearly (1) Name and address, and *railway station* to which the slides are to be forwarded, giving name of the railway company as well as that of the station. (2) The Letter and Number, as well as the title of the set. (3) Four alternative dates on which you could make use of the slides.

Please also note to which of the District Managers you should apply for the special set you want.

THE Association offers its sincere thanks to its President, Sir Richard Gregory, for the address on "British Climate in Historic Times," which contained much valuable original research. The first instalment is printed in this number, and the second will appear in our Summer number. It also records its pleasure in the visit of Professor Em. de Martonne, of the Geographical Department of the University of Paris, whose address on Transylvania, based on years of direct study of the region, will be printed in our Summer number. Students should note that a new edition of his "Géographie Physique" is about to appear. The papers on Railway Geography, given by Messrs. C. B. Fawcett and Ll. Rodwell-Jones, appear in this number. The report of the conference between the Meteorological Society, the Science Masters' Association, and the Geographical Association, will be issued by Messrs. Geo. Philip, 32, Fleet Street, London, E.C. 4, as a separate memorandum, price 1/6 + postage, and teachers should certainly try to secure this pamphlet, which will contain most valuable matter for the study and teaching of the meteorological aspects of geography. The Association Meetings were fortunate in that Mr. L. MacD. Robison, of Ceylon, to whose efforts geography in that island owes so much, was home on furlough and was able to address the meetings, and it is hoped that his address will be printed in a later number of the magazine.

MEMBERS are reminded that the special limited paper-covered editions of "The Hampshire Gate," by Miss H. G. Dent (5/6 + 4d. postage), and "The Dravidian Element in Indian Culture," by Dr. Slater (5/- + 4d. postage), are rapidly disappearing, and they should secure their copies by writing at once to the Clerk, through whom all orders must be sent. The books of folk tales which Miss Fleming published a few years ago are also being re-issued in cheap editions for members of the Association, "Ancient Tales from Many Lands," 5/- + 4d. postage, and "Stories from the Early World" (with several coloured plates), 7/6 + 4d. postage. A member asks us to try to secure for him the following numbers of the "Geographical Teacher," now out of print:—Nos. 2, 3, 4, 20, 23, 38, 51, 52, 53. He offers 2/6 per copy. Please send a postcard direct to Mr. J. Magraw, 91, Billinge Road, Pemberton, Wigan, if you have any of these for sale.

TEACHERS of geography in London will be interested in the work of The London Society, 27, Abingdon Street, S.W.1., which includes the preparation of an exhibit of maps showing the occupation of the various boroughs of London. Workers are needed, and the Society will provide full instructions, together with maps and drawing materials, to volunteers, who should communicate at once with the Secretary of the Society at the above address. May we express the hope that some of our London branches will organise joint efforts to provide the data for the Society.

THE City of Bradford Education Committee published in 1923 a series of reports issued by the Advisory Curriculum Committees appointed by it. Seven pages are devoted to a report on geography, in which special mention is made of the articles and pamphlets issued by the Geographical Association. There are several useful recommendations, including the one so ably put forward by Mr. Ernest Young in our last number, namely, that due regard should be paid to a right sequence of facts in the presentation of geography. Two useful schemes of work are outlined, and suggestions for apparatus and books are given. The work of our enthusiastic Bradford branch is evident here, and we offer our congratulations both to the Education Committee and to the Branch on a valuable effort. Will any other branches that are in touch with Education Committees willing to issue such reports please communicate with the Editor?

THE Editor wishes to draw the attention of members to the increase in size of this magazine, and to the attempt now made to include longer articles of a type which, it is hoped, may be of permanent use to teachers in all types of schools. There are special opportunities for teachers of literature, history and geography to co-operate in the matter of study of British climate on the lines suggested by our President. In this year of the exhibition at Wembley it is peculiarly important to utilise material concerning native races, and many teachers have found it difficult to get illustrated accounts of South African native life in suitable form. A friend who wishes to remain anonymous has continued in this number his generous help towards telling us what Spaniards are thinking about their own country and its geographical problems. And the other articles have such direct bearing on the teacher's work that further recommendation is unnecessary.

THE Association records its deep gratitude to the officers of the United States Department of Agriculture for the gift of four parts of the

"Atlas of American Agriculture," issued 1918, 1919, 1920, 1922, from the Government Printing Office at Washington. They deal with Precipitation and Humidity, Frost and the Growing Season, Crops (of which Section A deals with Cotton) Rural Population and Organizations. Each section is illustrated on the richest scale by maps which give invaluable information. The maps of frost distributions, of every aspect of rainfall, of soils in the cotton belt, of distribution of immigrants from different European countries in the rural population of U.S.A., and many others, are very striking and need detailed study. We hope to give a long and serious account of this great work when it reaches a later stage, and will but venture the remark here that it seems to us to mark an advance from meteorology into the domain of climatology and a forward move in demography. Maps with layer tints are given as well as maps on the stipple basis, and students have opportunities of comparing the two schemes.

THE Board of Education wishes to encourage organised visits of school children to the British Empire Exhibition at Wembley. A scheme of Empire Study has been prepared, and is now accepted by the Board. High Commissioners and others are considering the possibility of supplying literature both for reference and for distribution, and are providing the services of experts at the Exhibition. A weekly bulletin of lessons dealing with the Dominions will be issued by the Educational Sub-Committee, and we hope that it may gain a wide circulation among teachers. The co-operation of the Geographical Association has been sought in many details, and is being given without reserve.

WE are pleased to notice that the Committee of the old London Branch are organising a fund for the purpose of presenting a testimonial to Mr. E. J. Orford who has done so much for geographical teaching and the work of the Association in London for many years. Further particulars may be obtained from the Hon. Secretary of the fund, Mr. C. B. Thurston, 27, Brooksville Avenue, London, N.W.6., and subscriptions of two shillings and upwards will be received and acknowledged by the Hon. Treasurer, Mr. L. S. Suggate, 2, Kings Road, London, N.4.

MEMBERS are reminded that this year the School of Geography at Oxford will hold its twelfth Vacation Course. Full details are given on another page and intending students should apply at an early date.

ON March 10th Lt.-Colonel Howard Bury will give an address on "The Frontiers of India" at Westminster School. The secretary of the Westminster branch extends a cordial invitation to all London members to attend. Details from Miss Freeth, St. Martin's High School, 15, Charing Cross Road, W.C.2.

THE Hon. Secretary gratefully acknowledges on behalf of the Geographical Association the following gifts received during 1923, which have helped to make possible the improvement in the Magazine, the additions to the Lending Library and the inauguration of the Lantern Slide Scheme. The Lending Library and the Lantern Slide Collection are still at an early stage of development and the Association will welcome any help members or friends feel able to give during 1924. The list given below is in order of date of receipt, beginning January 1st, 1923, and ending December 31st, 1923.

	£	s	d
Miss Jane Howarth ...	0	2	6
Mr. J. Trask	0	2	6
Mr. J. Toothill	0	1	6
Miss H. Ratcliffe	0	5	0
Rev. W. H. Braine ...	0	2	6
Miss Capewell	0	10	0
Mr. S. J. Nixon	0	2	6
Mr. E. B. Markham ...	0	2	6
Mrs Ormerod	0	5	0
Hornsey Branch ...	1	10	0
Anonymous	2	2	0
Bradford Branch	5	0	0
Sir Charles Lucas ...	0	10	0
Miss Engvall	0	2	0
Mr. W. F. Stacey	0	5	0
Mr. W. J. Atkins ...	0	2	0
Mr. H. R. Howard ...	0	5	0
Miss E. Lefebvre ...	0	2	0
Miss A. T. French ...	0	2	0
Miss L. Black	0	2	6
Miss E. Brookes ...	0	2	6
Mr. A. Hesling	0	2	6
Miss Goldstein	0	2	6
Miss L. Baguley ...	0	2	6
Mr. E. Baldwin	0	2	6
Miss M. C. Saxton ...	0	5	0
Mr. Jas. Chance ...	0	10	0
Mr. P. W. Bryan ...	0	5	0
Miss M. S. C. Hunt ...	0	2	0
Mr. E. L. Mellersh ...	0	1	0
Mr. T. A. Southern ...	0	1	0
Mr. C. C. Carter ...	0	14	8
Mr. H. Grime	0	2	6
Miss E. E. Feather ...	0	5	0
Mr. R. N. Sayce ...	1	1	0
Mr. A. F. Hunt	0	2	6
Miss I. M. Crow ...	0	6	0
Mr. T. J. Jones ...	0	5	0
Miss Barber	0	2	6
Mr. W. F. Morris ...	0	2	6
Bristol Branch	3	0	0
York Branch	1	0	0
Swansea Branch	1	0	0
Brighton Branch ...	1	1	0
Mr. E. C. Walker ...	0	2	6
Westminster Branch ...	1	12	0
Mr. G. H. Coster	0	5	0
Mr. R. C. Burn ...	0	2	6
Miss A. S. Grindley ...	0	5	0
Miss M. Wigzell	0	1	0
Miss Beaumont	0	10	0
Mr. E. E. Lupton ...	2	0	0
Miss F. A. Thomas ...	0	10	0
Miss M. V. Couser ...	0	5	0
Mr. O. J. Harding ...	0	4	2
Miss M. C. Saxton ...	0	5	0

	£	s	d
Miss Ratcliffe	0	5	0
Miss Harding	0	10	0
Mr. L. Morris	0	2	6
Miss A. M. Stoddart ...	0	6	6
Mr. A. J. Jarvis ...	0	2	6
Miss E. E. Jackman ...	0	2	6
Mr. T. M. A. Cooper ...	0	10	0
Miss M. A. Oddie ...	0	2	6
Mrs Winfield	0	4	0
Miss Kerr	0	5	0
Mr. G. S. Hinchliffe ...	0	2	6
Mr. J. Twells	0	5	6
Miss V. Monks	0	10	0
Miss G. Lewis	0	5	0
Mr. J. F. Mitchell ...	0	5	0
Mr. J. F. Horrabin ...	0	5	0
Mr. A. J. Watson ...	0	2	6
Miss Casson	0	2	6
Miss Farrell	0	5	0
Mr. E. W. Fry ...	0	2	6
Miss Strong	0	5	0
Lady Courtney of Penwith	0	10	0
Miss M. Beeson ...	0	2	0
Miss Miles	0	2	6
Miss A. J. Bayford ...	0	2	6
Mr. W. L. Dix ...	0	5	0
Miss M. E. Cope ...	0	2	0
Miss Hutchinson ...	0	2	6
Miss A. Brindley ...	0	5	0
Anonymous	21	0	0
Miss McLean	0	5	0
Miss Adam	0	5	0
Summer School, Aberystwyth	5	17	6
Mrs Burgess	0	2	6
Bishop Auckland Branch	2	10	0
Mr. Ernest Young ...	1	11	0
Mr. Tunstall	1	1	0
Mr. Ll. Rodwell Jones ...	1	1	0
Mr. C. H. Saxelby ...	0	5	0
Miss Lawrence, Roedean School	1	0	0
Liverpool Branch ...	1	5	0
Bournemouth Branch ...	1	6	0
Ald. J. H. Lloyd ...	5	0	0
Plymouth Branch ...	2	0	0
Anonymous	1	1	0
Miss L. Earp	0	10	0
Dumfries Branch ...	1	1	0
Hereford Branch ...	2	2	0
Mr. J. B. Philip	0	2	6
Miss B. O. Eade ...	0	5	0
Mr. W. J. Lewis ...	0	7	10
Mr. W. A. Cadbury ...	5	0	0
Miss B. Slesser	0	5	0
Miss H. E. Peel ...	0	2	6

	£	s	d		£	s	d
Miss E. Clayton	0	2	6	Miss Beaumont	0	10	0
Principal, Southampton	0	5	0	Mr. MacNab	0	5	0
Miss E. Simmons ...	0	2	6	Miss Howarth	0	2	6
Miss G. Freeth ...	1	1	0	Mr. G. W. Wilks ...	0	1	0
Miss E. H. Burton ...	0	5	0	Mr. A. W. Pears ...	0	2	6
Miss Farrell	0	5	0	Miss Chalk	0	5	0
Mr. Sell	0	2	6				

Several gifts have been received since December 31st, 1923, but these will be printed in our list for 1924. As shown on our Balance Sheet, the Bradford Branch gave a further £10, and a collection at the Annual Business Meeting amounted to £12 16s. 6d.

Donations of Library Books have been made by :—

Mr. H. Batsford
Dr. H. R. Mill
Dr. Vaughan Cornish
Mrs. Hingston Quiggin
Miss Joan B. Reynolds

Donations of Lantern Slides have been made by :—

Miss E. H. Burton
Miss Lee
Mr. Woodhouse
Mr. A. L. Minns
Mr. James Fairgrieve
Mr. R. J. Steele
Mr. A. D. Firth
Miss E. H. McLean
Miss L. M. Adam

Negatives have been given by :—

Miss L. Lee
Miss P. G. Moss
Miss Walton.

Negatives have been lent by :—

Mr. W. H. Barker
Mr. W. W. Jervis.

Notes for our Sheet Catalogues have been contributed by :—

Miss Adam
Mr. W. H. Barker
Miss E. H. Burton
Mr. James Fairgrieve
Mr. W. W. Jervis
Miss McLean
Mr. A. L. Minns

THE Librarian asks us to state that a new Catalogue of Books in the Postal Lending Library is being issued. The growth of the Library has made this a rather costly proceeding and we regret that we must in future charge members sixpence per copy of this new issue if they require it.

It is with great pleasure that congratulations are offered to the faithful and energetic Hon. Secretary of the North Lancashire Geographical Association, Mr. F. H. Smith, on his publication in association with Mr. G. Grace, of a valuable discussion of the features of glaciation in Furness. The article appears in *Proceedings Yorkshire Geological Society,* Vol. xix, Part vi, 1921-2. The authors think that before the Ice Age the Lake District, having been very long exposed, had a rather subdued relief in the sense of the term as used by W. M. Davis. This has been altered by the Ice Age and we find angular rocky scenery with curious basin-like depressions. The Coniston Basin, for example, is looked upon as largely a product of the Ice Age. The authors find it very difficult to sub-divide the series of deposits due to local glaciers and ice sheets, but they are clear about the Irish Sea Drift as containing two distinct beds of boulder clay separated by a series of sands and gravels, while in North Walney is found a nine-foot layer of peat on top of the lower Boulder Clay. A special study of the glacial lake Duddon in various phases down to its disappearance is given. There are several maps.

THE GEOGRAPHICAL ASSOCIATION.

ANNUAL REPORT FOR 1923.

THE ASSOCIATION on December 31st, 1923, numbered 4,510 full members, excluding all members in arrears of subscription, and all associate members. The totals for the past six years have been 996; 1,458; 2,379; 3,965; 4,159; 4,462. In view of the unemployment and difficult conditions among teachers it is good to be able to record even a small increase in membership. The number of branches continues to increase, and we specially welcome the new and enthusiastic branch formed in Burma, under the direction of Dr. L. Dudley Stamp, Professor of Geology and Geography at Rangoon University. The work of the branches this year has been characterised by a good deal of individual enterprise. Several branches have secured the co-operation of the local Education Authorities in arranging courses of lectures on the teaching of geography, others have undertaken and successfully carried out valuable work in regional surveys, and most branches have arranged for outdoor work in the locality during the summer months. The formation of several new branches in rural districts where there is a possibility of only a small attendance has been a marked and valuable feature this year, as also has been the great increase of the number of associate members in each branch. It is only by the steady persistence of such efforts that the value of geography as a preparation for citizenship can be brought home to the nation, and, when public opinion has once been roused on this point, the difficulties that still in some cases hamper geographical studies will disappear. Further progress towards this has been made during the year, Manchester and Bristol Universities being now in a position to offer honours courses in geography to their students. It is regrettable that the Universities of Birmingham and of Durham are still unable to offer facilities to students of geography, but Birmingham is making an effort to have this hiatus in its educational facilities removed, and it is hoped that a Department of Geography will be established there as soon as funds permit.

Candidates offering geography as a subject in their first public examination still find themselves at a disadvantage in some cases. We would urge all geography teachers whose pupils take examinations in which the regulations place them at a disadvantage to communicate directly with the secretary of the Examining Board in question, so that there may be a realisation of the widespread demand for an alteration of such regulations.

A promising feature for the improvement of geographical teaching is the keen demand for serious geographical works on the part of the 500 or more members who use the postal lending library now including 644 books. Every attempt is being made to provide the books required, some 120 volumes having been added during the year. We welcome all suggestions and requests for further additions, for serious attempts to study and appreciate the truth about men's problems in all regions are one of the surest ways of diminishing those international prejudices and misunderstandings which are bearing such bitter fruit to-day. For some months the Central Office has been busy in arranging a postal lending collection of lantern slides. This will be available for library members in 1924, and, though it is only a nucleus at present, there is every reason to hope that it will increase as rapidly as the library has done. Our sincere thanks are due to Mr. W. H. Barker, Reader in Geography at Manchester University, for preparing notes for a series of slides on West Africa, to Mr. James Fairgrieve for preparing notes for a series of slides on Norway (and also for presenting the slides themselves) to Mr. W. W. Jervis, of Bristol University, for notes on sets for Rumania and for Iceland, to Mr. A. L. Minns, of Brighton, for notes on two sets of slides on Switzerland (and also for presenting the slides themselves) and to Misses Burton and Walton for similar gifts of slides with notes. It gives us great pleasure to add that Professor J. L. Myres, of Oxford, has kindly promised a set of notes on slides of Greece, and Professor P. M. Roxby, of Liverpool, a set of slides of China and of India. It will thus be seen that many of the slides and notes will have the added educational value of having been prepared by eminent geographers who have studied the countries described at first hand.

Our sincere thanks for help in facing the financial strain involved in the inauguration and development of these two schemes are offered to all those members who have sent us contributions; to the Bristol, Swansea, York, Brighton, Westminster, Bishop Auckland, Liverpool, Bournemouth, Dumfries, Hereford, Plymouth and Bradford branches, which have all contributed generously; to the anonymous friend who gave £21, and to the following who, though not members of the Association, came to its help in this difficulty:—Miss Lawrence, of Roedean School, Brighton; Alderman Lloyd, of Birmingham, and Mr. W. A. Cadbury, of Birmingham; Mr. Tunstall, of Aberystwyth; Mrs. George Cadbury, of Birmingham. The full list of gifts is printed in the magazine, and our warmest thanks are offered to our kind supporters in this effort to help teachers of geography.

The Association owes much to its President for 1923, Sir John Russell, D.Sc., F.R.S., who has supported all its activities most enthusiastically and who gave stimulating addresses both at London and at Shrewsbury. He is specially interested in any regional studies carried out by our branches and has asked us to keep him informed of all such efforts. It is with great pleasure that we welcome as his successor Sir Richard A. Gregory, D.Sc., Emeritus Professor of Astronomy at Queen's College, whose services to the cause of scientific education in general and to the improvement of geographical researches are too widely known to need comment.

Members will be glad to know that Mr. Chisholm, who has just retired from his geographical duties at Edinburgh University, has kindly consented to give the Herbertson Memorial Lecture in 1924. Mr. Alan Ogilvie, who succeeds Mr. Chisholm at Edinburgh, is an old and valued friend of the Association, and we offer him our congratulations and trust that the general recognition of the importance of geography will soon result in the establishment of an honours school. We also offer congratulations to University College, Leicester, on its having established a department of geography from the first and to Mr. P. W. Bryan, who has been placed in charge of geography there.

It is with sincere regret that we record the death of the Rev. James Gow, for many years a Trustee of the Association, and one of its steadiest supporters.

The Association's thanks are offered to the Mayor and citizens of Shrewsbury, who gave our Association a warm welcome at its spring meetings, and to our President, Sir John Russell, D.Sc., F.R.S., to Principal J. H. Davies, M.A., of University College, Aberystwyth, for their valuable addresses, and to Mr. Hinton, M.M.I., and to Mr. J. W. Stones and Miss Auden, for help in excursions and local arrangements.

The work of the Touring Committee still continues to be of the utmost value, and considerable extensions of its activities are contemplated. All its members, and the leaders of the tours, and Mr. E. E. Lupton, its devoted Chairman, are to be congratulated heartily on the results of their efforts in 1923, which must have borne much fruit in added interest and depth in geography lessons up and down the country.

Messrs Benn have added to the list of monographs published under the editorship of the Hon. Sec. two new books, "The Hampshire Gate," by Miss H. G. Dent, and "The Dravidian Element in Indian Culture," by Dr. Gilbert Slater. Previous books published in these series are "The English Village" and "The Bronze Age and the Celtic World," by H. J. E. Peake; "The Wealden Iron Industry," by Miss M. C. Delany (now out of print); "The Evolution of Climate," by C. E. P. Brooks, and "The Races of England and Wales," by H. J. Fleure. The publication of serious research is one of the most important aims of our Association and members are asked to support these efforts and thus make further publication possible.

During 1923 a joint committee of the educational and geographical sections of the British Association, with Principal Nunn as Chairman, and Mr. W. H. Barker as Secretary, has drawn up a memorandum on Geographical Teaching. It is a most important publication and members may purchase it from the secretary of the British Association, Burlington House, London, W.

Several further lists have been issued by the Permanent Committee on Geographical Names. This effort to establish some sort of order in the chaotic spelling of place names should be supported by all our members, who are specially invited to purchase these lists. The address of the Committee is Royal Geographical Society, Kensington Gore, S.W.7.

International intercourse between teachers of geography, so seriously interrupted by war and post-war conditions, is being gradually resumed and we record with pleasure the acceptance of Professor Em. de Martonne of the University of Paris, of an invitation to speak at our annual meetings in January, 1924, and also that of Mr. L. Mac D. Robison, of Ceylon, who has done such valiant service for the cause of geography in that island.

The rapid growth in the number of branches and members, and the wide expansion in the activities of the Association, have rendered a revision of the Constitution imperative. Suggestions for this revision have been considered at each Council meeting during 1923 and will be laid before the Annual Business Meeting. The revised draft will be printed in the Spring, 1924, magazine, so that members may consider it during 1924 with a view to its confirmation in 1925.

The Association has once more to express its thanks to Mr. V. C. Spary for his able and devoted services in the arrangements for our Annual Meetings, and to the authorities of Birkbeck College for the hospitality they extend to us each January. It also has to thank the Railway Companies for special reduced rates allowed to members attending the January Conference.

Into the East. R. Curle. pp xxxi + 224, 20.5 x 13.5 cm. London: Macmillan, 1923. 10/6.

A book of lightly written sketches, chiefly of Burma and the Federated Malay States. Scottish Rangoon, Royal Mandalay crumbling under the attacks of the fungus of western civilization, as the author calls it, hill stations and the Chinese frontier, the Federated Malay States with their capital, the Chinese town called Kuala Lumpur, and their rubber plantations, all come in for gossiping comment by one who is evidently an old hand at the game of travel. Some readers will enjoy a preface of 16 pages by Joseph Conrad on Travel and its Literature.

ANNUAL BALANCE SHEET, 1923.

RECEIPTS.	£	s.	d.
Balance from 1922	5	9	2
Subscriptions.—1. Current	786	3	8
2. Arrear	0	15	0
3. Library (current)	43	1	0
Advertisements	148	13	3
Interest on Investments	61	0	0
Sales	95	6	1
Gifts	100	15	2
Touring Committee Grant	25	0	0
Refund from Branch	5	16	0
Reclaimed Income Tax	10	16	0
Returned Library postage	11	13	4
*Deficit	35	6	8
Total Receipts	£1329	15	4

* This has been raised in the following way:—The Bradford Branch contributed a further £10, a collection at the Annual Business Meeting amounted to £12 16s 6d, and the Touring Committee agreed to give the remaining £12 10s 2d.

EXPENSES.	£	s.	d.
Geographical Teacher.—Printing 3 Nos. ...	395	9	8
Blocks	16	4	0
Postage from Newtown	83	13	11
Printing and Stationery	131	14	0
Typewriter	13	0	0
Rent (6 months)	12	10	0
Salary	300	0	0
Addressograph	14	3	6
Bank charges	2	12	6
Library and Lantern Expenses (other than printing and office disbursements) ...	58	18	0
Office Expenses	45	10	0
Postage	113	12	3
Annual Meetings	27	17	0
Officers' Expenses	6	6	0
Gift to R.G.S. Committee on Place Names ...	1	1	0
Subventions (other than those deducted by Secretaries)	49	13	6
Wages	57	10	0
Total Expenses	£1329	15	4

CAPITAL ACCOUNT, 1923.

RECEIPTS.	£	s.	d.
Balance from 1922	65	1	8
Life Compositions	45	0	0
Interest	0	9	10
Total	£110	11	6

EXPENSES.	£	s.	d.
Purchase of £100 War Stock	101	16	0
Repaid to Current Account	1	0	0
Balance in hand	7	15	6
Total	£110	11	6

The Property of the Association includes the following:—

£1,200 of 5 per cent. War Stock 1929-47, of which £240 is allocated to the Herbertson Memorial Fund. The remaining £960 is held by the Trustees for the general purposes of the Association.

Stock valued at £2,000, including the Library, the Lantern Slide Collection, the Office equipment, and the Stores of the Association.

STATUTES AND STANDING ORDERS OF THE GEOGRAPHICAL ASSOCIATION.

(See Note on Page 242).

I. STATUTES.

1.—The Association shall be called the GEOGRAPHICAL ASSOCIATION.

2.—Membership shall be open to teachers of geography and to all who are interested in the teaching of geography.

3.—Where ten or more members agree to meet from time to time, on being called for that purpose by a committee which they shall appoint, a branch of the Association shall be formed and the Committee shall be called the Branch Committee for the purposes hereinafter described.

4.—The affairs of the Association shall be governed by a Council appointed as prescribed in Standing Order 1, and this Council shall have power at its Annual Meeting to appoint from its own number an Executive Committee constituted as prescribed in Standing Order 4 to act on its behalf, in the interval between the meetings of the Council of the Association.

5.—The Council shall elect not later than October 1st in each year a President of the Association for the year next following.

6.—The Council shall elect members from time to time as Vice-Presidents of the Association. The Vice-Presidents of the Association shall not number more than six at any time. The Presidents of Branches shall be additional Honorary Vice-Presidents of the Association.

7.—Branch Committees shall have power to admit non-members as Associates of the Branch and such Associates shall be subject to the regulations of the Branch, but shall not exercise the rights privileged to members of the Association.

8.—The Council shall have power to maintain a library for the use of members under such conditions as shall be determined by regulations which it shall approve.

9.—The Council shall have power to maintain a journal to be distributed to members under such conditions as it shall determine, and shall have power to issue books, pamphlets, illustrations and circulars.

10.—The Council shall have power to elect persons of note as Honorary members of the Association by the vote of a two-thirds majority of the Council at two meetings of not less than 15 persons specially called for that purpose under the Standing Orders following hereafter.

11.—Any member may be removed from the Association by a two-thirds majority of the Council at a meeting of not less than 15 persons specially called to consider the removal of a member.

12.—There shall be no entrance fee for membership of the Association and the Annual Subscription shall be 5s. payable annually on the first day of January.

13.—At any time after joining the Association any member shall be at liberty to commute all future annual subscriptions by the payment of one sum of £3 10s. or if he shall have paid the annual subscription for ten consecutive years or more, by the payment of one sum of £2 10s., which shall entitle such member to all privileges and rights of ordinary membership for the remainder of his life. In the event of a life member resigning or being removed from the Association under Statute II no part of his life subscription will be returnable nor will there be any claim on the Association's funds for life membership fees or any part of the same should the Association at any time cease to exist.

14.—The Council shall give at least one month's notice to all members of the Association of an Annual General Meeting to be held each year in December or January, and shall give on that notice full details of any business to be transacted in so far as it may affect the Statutes and Standing Orders of the Association or the election of persons under such Statutes or Standing Orders.

15.—The Annual General Meeting shall receive a report on the affairs of the Association and its work for the preceding year and a complete and duly audited statement of the accounts of the Association. These shall have been previously approved by the Council and shall require the approval of such Annual General Meeting.

16.—The Funds of the Association shall be invested in the names of three Trustees elected by the Council of the Association. The signatures of any two of the three shall be binding.

17.—These Statutes shall be alterable only by a majority vote at two successive Annual General Meetings called under Statute 14.

II. STANDING ORDERS.

1.—The Council of the Association shall consist of the following :—

(a) The President, elected under Statute 5.
(b) The President of the Association for the previous year.
(c) Two of the Vice-Presidents of the Association specially chosen by the Council from among its six Vice-Presidents for that purpose. One of these persons shall act as Chairman of the Council and shall be so styled.
(d) One member elected from time to time by the Council duly called for this purpose as Honorary Secretary and Editor of the Association.
(e) One member elected in the same way as Honorary Treasurer of the Association.
(f) The Chairmen of Standing Committees of the Association appointed under Standing Order 9.
(g) For the present, and so long as the Association's offices shall remain at a distance from London, one member elected by the Council as Honorary Assistant Secretary of the Annual General Meeting.
(h) The Associate Editor.
(i) The Auditor, appointed from time to time by the Council.
(j) The Solicitor, appointed from time to time by the Council.
(k) The Trustees.
(l) One Representative from each branch of the Association the number of whose members does not exceed fifty, and two representatives from each branch of the Association the number of whose members exceeds fifty.
(m) Twelve Councillors, of whom four shall be elected each year at the Annual General Meeting of the Association for a period of three years, and shall not thereafter be eligible for re-election for at least 12 months. In the case of death or resignation of a Councillor elected under this clause, who has not held office for three years, a person shall be elected at the Annual General Meeting of the Association to hold office for the unexpired term of office of the Councillor thus replaced.

2.—The Council shall meet once in the year in connection with the Annual General Meeting of the Association, such meeting to be styled the Annual Meeting of the Council, and once otherwise in the year if and when the Association holds a general meeting other than the above. Further meetings may be called by the Hon. Sec.

3.—The Executive Committee shall consist of the President, two Vice-Presidents, the Hon. Treasurer, the Hon. Secretary, and Editor, and at least eight other persons selected by the Council as prescribed in Statute 4.

4.—Six weeks if possible before each meeting of the Council each Branch Secretary shall send to the Secretary of the Association the name and address of the representative, if any, which the Branch proposes to send to the forthcoming Council Meeting.

5.—At each Annual Meeting the Council shall receive reports from the Hon. Treasurer, the Hon. Auditor, the Hon. Secretary, and the Executive. It may consider, on due notice given to all members in the circular calling the meeting, any matter whatsoever relating to the business of the Association.

6.—The Executive Committee shall administer the affairs of the Association on behalf of the Council, save that the Council may reserve any matter specially for its own consideration.

7.—The Council shall from time to time appoint one person to act as its Secretary and as Librarian of the Association to whom it shall order to be paid such remuneration as it shall determine. The Secretary and Librarian thus appointed shall act under the general guidance of the Honorary Secretary and shall attend the meetings of the Council and Executive Committee as often as possible.

8.—The Council shall have power to appoint from time to time Standing Committees of the Association which shall thereupon be described in this Standing Order.

(a) The Tours Standing Committee shall consist of the President, the Honorary Secretary and the Honorary Treasurer of the Association, and such other members of the Association as may be appointed from time to time by the Council to organise travel opportunities for the members. This Standing Committee may co-opt additional members for periods not exceeding three years, provided that such co-opted members shall not at any time exceed one-third of the total number of members of the Committee.

(b) The Regional Surveys Committee shall consist of the President, the Honorary Treasurer and the Honorary Secretary of the Association and such other members as may be appointed from time to time by the Council to assist in the development of comprehensive direct studies of selected neighbourhoods. This Standing Committee may co-opt additional members for periods not exceeding three years, provided that such co-opted members do not at any time exceed one- third of the total number of members of the Committee.

9.—The Council of the Association shall elect one member of each Standing Committee to act as its Chairman and another to act as its Hon. Secretary.

10.—The Standing Committees shall be empowered to organise meetings and to take other steps to promote their various aims, subject always to the suspensory veto of the Hon. Secretary of the Association on any decision of a Standing Committee. In cases of dispute the Council of the Association shall have power to make a final decision at a meeting specially called for the purpose. The notices of meetings and other routine letters and reports may be circulated by the Central Office of the Association or otherwise with the consent of the Hon. Secretary of the Association. The Central Office shall be given due and sufficient notice of all work it is asked to do for a Standing Committee.

11.—The Standing Committees shall not have power to pledge the financial resources of the Association, save by special resolution stating the amount, at the January meeting of the Council, and shall submit to the Council of the Association at least one report in each year not later than September 30th, together with a full statement of any funds that they may have administered.

12.—The Secretary of each Standing Committee shall send a report of each of its meetings to the Hon. Secretary of the Association within a fortnight of such meeting, and shall furnish a list of attendances and be responsible jointly with the Hon. Secretary of the Association for an annual report and a complete revision of the list of members to be made not later than the first of June of each year.

13.—The Treasurer shall assist the Funds of the Branches of the Association by authorizing payments not exceeding one shilling and sixpence per head on any number of full members of a branch up to twenty and one shilling per head on the full members of a branch beyond the number of twenty. These payments shall be made on submission of a record of work satisfactory to the Council.

14.—The affairs of a Branch shall be managed by a Committee consisting of a President, *who shall be designated an Honorary Vice President of the Association,* an Hon. Secretary, and an Hon. Treasurer and such other officers and members as the Branch may appoint. With the consent of the Hon. Secretary of the Association, duly appointed officers of a Branch may assist in collection of membership subscriptions. Each Branch shall send an Annual Report to the Council not later than October 31st.

15.—These Standing Orders may be altered by a majority vote of the Annual General Meeting if the Council reports that it has had the alteration sent to it for its consideration in due course before that meeting, and if the proposition for alteration is duly set out with a report of the Council upon it in the notice calling the Annual General Meeting.

16.—The Council may suspend any Standing Order or portion of a standing order subject to report in the notice calling the next Annual General Meeting and to confirmation of its action by that meeting.

17.—The Honorary Treasurer shall have the duty of signing cheques on behalf of the Association and with the consent of the Council may delegate this power as regards cheques of smaller amount than £100 to another officer of the Association.

BRITISH CLIMATE IN HISTORIC TIMES.

PRESIDENTIAL ADDRESS BY SIR RICHARD GREGORY, D.SC., F.INST.P., F.R.A.S.

PART I.—PRE-INSTRUMENTAL LITERARY REFERENCES.

WHEN I was invited to offer myself for election as president of the Geographical Association, I accepted the invitation with diffidence as well as satisfaction—diffidence because of my imperfect knowledge of many details with which teachers of geography to-day are expected to be familiar, and satisfaction in the prospect of an honour which I had no reason to expect and for which my particular qualifications are few. My connexion with geography is through Physiography or general science, and my interest in it has grown with the remarkable developments which the subject has undergone in recent years as a formative means of instruction in schools.

The beginning of the change on the scientific side may be placed early in the present century, when an admirable course of instruction in Physical Geography was issued by the Cambridge Local Examinations Syndicate. The teaching of general geography was, however, little affected by this syllabus, though the need of improvement was widely felt and expressed. Twenty years ago (September, 1903) I wrote in the "School World": "What is wanted at the present time is a course of general geography for schools which will cultivate the mental activities of the pupils and can be carried out almost entirely in the class-room. A good atlas, and a work of reference such as Whitaker's Almanack, or the Statesman's Year Book, provide material for study; and practical exercises based upon them, or upon results of observations made in leisure hours, should be worked by students in their note-books. When someone has shown how this can be done, a real commencement will have been made in the application of scientific methods to the study of geography in schools."

Two years later, the Board of Education improved the position and prospects of geography by requiring not less that two periods of school work and one of home work to be allotted to the subject in secondary schools, and by issuing a suggested four-year course in which practical work in school and out was given a prominent place. There was not then a single text book which provided the necessary guidance for teacher or pupil in a course of this kind: now there are scores written from the modern point of view of cause and consequence, and including exercises which train the intelligence as well as afford information to stimulate the imagination.

The Geographical Association has taken a leading part in these and later developments, and from being a voice crying in the wilderness has become the established centre of geographical progress in so far as it is related to instruction in school, college, or university. In this work the services rendered by the *Geographical Teacher* cannot be over-estimated, and every teacher of geography must be grateful to the Editors for the high standard continually maintained, and to the contributors of the numerous original and suggestive articles which have appeared in the journal. In the year 1908, the Association arranged a successful course of lectures at University College, London, upon various aspects of the new movement, and I was privileged to give one on "Scientific Method in the Teaching of Geography." As in science teaching generally, the use of observational or practical exercise has often been carried too far since then, with the consequent loss of the spirit which gives life to a subject. I anticipated this danger in my address and urged then, as now, that the human side of geography should not be neglected. "Combined with the collection and consideration of facts," I said, "there should be a course of reading or descriptive lessons intended to inspire interest in the earth and its inhabitants by word and picture, and to cultivate appreciation of what may be termed the intangible influences and factors of geographical character."

The scientific method consists in the collection and arrangement of facts with the object of discovering relationships and arriving at correct conclusions. "British Climate in Historic Times," which in a rash moment I selected as the subject of my address, lends itself appropriately to consideration by scientific methods because of the diverse views and beliefs held concerning it. The main thing is to bring together whatever facts exist and to extract as much information as possible from them. In this address I cannot do more than give a selection of the material available, but with the assistance of Mr. R. W. Marston, I have brought together references to weather so far back as the eighth century, as well as records of rainfall and temperature for 150 years or so. The extracts and observations relate chiefly to conditions in London, so that the use of the word "British" in the title of this address is not perhaps justified, and I can only offer as an excuse the limitations which an address of this kind necessarily impose upon me. My examination of the material is also more superficial than I would wish. If there be any virtue in what I have attempted, it lies in the collection of references to weather in England from various standard writers over a period of about a thousand years.

ENGLISH VINEYARDS.

As evidence of what is believed to be a change of British climate for the worse, reference is often made to the cultivation of the vine out-of-doors in earlier times. Nicholson's "Dictionary of Gardening" and Amherst's "History of Gardening in England" give some particulars of these early vineyards. The Emperor Augustus is credited with the introduction of the vine in this country about A.D. 10, and the Emperor Probus, A.D. 280, encouraged the plantation of vineyards in Britain. Tacitus, however, writing in the first century, says that the climate of Britain is not suitable for the cultivation of the olive or the vine. Bede, who wrote about 731, says Britain "produces vines in some places." Thirty-eight vineyards in different counties are included in the Domesday Book, but some are said to bear grapes and others are not. Nicholson says:—

> "The Isle of Ely was called the Isle of Vines by the Normans, the Bishop of Ely, shortly after the Conquest, receiving as tithes wine made from the vines grown in his diocese. In the reign of Henry III. we read of vineyards. Malmesbury mentions the county of Gloucester as being in his time very rich in vineyards; and there still remain traces of them at Tortworth. The first Earl of Salisbury planted a vineyard at Hatfield, which is noted as being in existence when Charles I. was taken there as a prisoner. There are records of vineyards existing in various parts of Surrey, and a notable one, which is still partly in existence, once flourished at Bury St. Edmunds. Vineyards seem to have been common to all monastic establishments; but the suppression of the latter, and, subsequently, the fact of cheap foreign wines becoming more easily accessible, led, no doubt, to neglect in grapes cultivation."

Messer Marc Antonio Correr, Venetian Ambassador in England, writes in 1611: "Instead of wine, which cannot be brought to maturity because of the insufficient heat of the sun, they usually drink beer." An account of the climate of England in State Papers (Domestic) Charles I., Vo. 17a, 1625, refers to "the defect of wine, grapes not commonly growing there, being supplied with the excellency of English beer." John Rose, gardener to Charles II., published in 1666 "The Engish Vineyard Vindicated, and the Way of Making Wine in France," with a preface by John Evelyn, but he only recommends where vineyards should be planted and gives instructions as to pruning and propagation. "In spite of the efforts of the writers of the early seventeenth century," says Amherst, "vine-culture was never really revived in England, and vineyards gradually ceased to be planted."

The truth seems to be that, with increased facilities of transport, wines imported from southern Europe superseded the coarser kinds made from grapes grown in England. For like economic reasons the profitable cultivation of vines in France has tended to move southward with the passage of time. In certain seasons vineyards in suitably protected districts would no doubt yield grapes from which wine could be made in England now as it was formerly, but whether it would please the palate of people used to the finer products of warmer regions is another matter.

In his "Ecclesiastical History" (Book I), the Venerable Bede (672—735) describes the climate of Britain as follows:—

> "Britain is rich in grain and trees and is well adapted for feeding cattle and beasts of burden. It also produces vines in some places. . . . Seals are also frequently taken and dolphins as also whales. . . . There is also a great abundance of snails of which the scarlet dye is made. Because it lies almost under the North Pole the nights are light in summer, so that at midnight the beholders are often in doubt whether the evening twilight still continues or that of the morning has come. On the other hand the nights in winter are 18 hours long, for the sun then withdraws into southern parts. In like manner the nights are very short in summer and the days in winter that is only six equinoctial hours.
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> "Ireland has a much healthier and milder climate than Britain; for the snow scarcely ever lies there above three days: no man makes hay in the summer for winter's provision, or builds stables for his beasts of burden. . . . The island abounds in milk and honey, nor is there any lack of vines, fish or fowl, and it is noted for the hunting of stags and roe-deer."

EIGHTH TO TENTH CENTURIES.

In the eighth century the year 721 is referred to in "Annales Cambriae" as "A very hot summer," and the Anglo-Saxon Chronicle says of 761: "in this year was the great winter." According to the Chronicle of Roger of Hoveden, there was a violent wind on December 24, 800, and "an inundation of the sea flowed beyond its limits."

These records make no mention of weather in the ninth or tenth centuries. A scarce book published under the title of "Frostiana" in 1814 gives, however, a Table of remarkable frosts, and this contains the following records:—

827. Frost in England for 9 weeks.
923. The Thames frozen 13 weeks.
987. Frost lasted 120 days: began December 22.
998. The Thames frozen 5 weeks.

Mr. E. J. Lowe includes the same meteorological occurrences in his "Natural Phenomena and Chronology of the Seasons," published in 1870, but no references are given in either work. It may be doubted whether such mention of remarkable frosts or weather of any kind is of any value unless recorded in the Anglo-Saxon Chronicle or other contemporary source. In the Chronicle, for example, nothing is said of a frost for 9 weeks in 827, but an eclipse of the moon is mentioned, and opposite the year 987 is a blank, showing that the chronicler had nothing to record.

ELEVENTH CENTURY.

When we come to the eleventh century, the Anglo-Saxon Chronicle has several references to wet and stormy years, but none to fine years, as will be seen by the following extracts :—the references to frost in this and later centuries are mostly from "Frostiana" and W. Andrew's "Famous Frosts and Frosts Fairs in Great Britain," published in 1887.

In all early records there are frequent references to unseasonable weather, great storms, thunder and lightning, but no more than would be set down by an observer in our own times. Heavy storms and exceptional weather occurred much the same then as now in different years and at different times of the year, but as the people were formerly directly dependent upon the "earth-fruits" of their districts they naturally gave chief attention to weather which reduced or destroyed their means of existence.

1035. Severe frost on June 24.
1041. All this year it was very sad in many things, both in bad weather and earth-fruits. (A-S Ch.)
1046. There was no man who could remember so severe a winter. (A-S Ch.)
1063. The Thames frozen 14 weeks.
1076. Frost in England from November until April 1077.
1086. This was a very heavy and toilsome year in England, and so great unpropitiousness in weather as no man can easily think. (A-S Ch.)
1087. Through the great tempests there came a very great famine. (A-S Ch.)
1092. Very severe frost.
1093. There was such a great deluge of rain, so great a season of rain, as no one remembered before. Then the winter coming the rivers were so frozen that they were a road to riders and to waggons. (Eulogium Historiarum).
1097. This was in all things a very sad year, and over grievous, from the tempests. (A-S Ch.)
1098. Great rains ceased not all through the year. (A-S Ch.)

TWELFTH CENTURY

Eight years of the twelfth century are described as bad or severe in the Anglo-Saxon Chronicle, as the following extracts show. The Chronicle of Roger of Hoveden notes the severe winter of 1115 and says, "nearly all the bridges throughout England were broken by the ice." John of Oxenden said that the Thames dried up in 1110, and Gervase of Canterbury says, "it was crossed with dry feet," in 1157. The first half of this century seems to have been exceptionally severe as regards weather.

1103. This was a very calamitous year in the land. (A-S Ch.)
1105. A very calamitous year. (A-S Ch.)
1110. The earth-fruits were greatly injured through tempests and the tree fruits over all this land almost all perished. (A-S Ch.)
1111. A very long and sad and severe winter. (A-S Ch.)
1112. This was a very good year and very abundant in wood and in field. (A-S Ch.)
1114-5. In this year there was so severe a winter with snow and with frost that no man that then lived ever before remembered a severer. (A-S Ch.)
1116. This year was a very gloomy winter, both severe and long. (A-S Ch.). Excessive rains came immediately before August and greatly troubled and afflicted people until Feb. 2. (A-S Ch.)

1117. This was a very deficient year in corn through the rains that ceased not almost all the year. (A-S Ch.)

1125. So bad a season as there had not been for many years before. (A-S Ch.)

1149-50. Severe frost from December 10 to February 19.

1173. There was an extraordinary season of fine weather throughout the winter and spring and the month of May until Ascension Thursday. (Chr. of Princes).

1175-6. Snow and frost lasted from December 25 to February 2. (Giraldus Camb.)

1193. Unusual storms, floods of waters, fearful and wintry thunderstorms throughout the whole of this year. (M. Paris).

THIRTEENTH CENTURY.

In the following extracts referring to exceptional weather in the thirteenth century, the sources are Eulogium Historiarum (E.H.); Matthew Paris's Chronica Majora (M.P.); John de Oxenedes' Chronicle (J.O.); and William Rishanger's Chronicle (W.R.). Twelve of the years in the century appear to have been very wet and they were fairly evenly distributed. There were exceptionally mild winters in 1245 and 1248, and severe winters in 1280-1 and 1292, and very hot summers in 1241 and 1242.

1202. About this year great rains caused floods throughout the whole world. (E.H.)

1205. Frost from January 15 until March 22.

1222-3. Inundations of rain from September 14 to February 2. (M.P.)

1234-5. Great frost from Christmas to February 2.

1236. In January, February, and part of March there were such floods of rain as no one remembered to have seen before. (M.P.) After a winter beyond measure rainy a constant drought attended by an almost unendurable heat succeeded which lasted for four months and more. (M.P.)

1239. In the four months preceding Easter the flooding rain clouds did not cease. (M.P.)

1240. In March, April, and May the season was dry, but for the rest of the months rainy. (M.P.)

1241. From March 25 to October 28 continuous dryness and incomparable heat dried up the deep marshes and broadest ponds and exhausted the rivers. (J.O.)

1242. Stormy in winter: dry and very hot in summer. (J.O.)

1245. Plenty of corn and but little frost. (J.O.)

1248. Barns full of corn: very mild winter. (J.O.)

1248. The temperature of the winter was entirely changed to that of spring so that neither snow nor frost covered the face of the earth for two days together. (M.P.)

1254. From the middle of autumn until spring continually stormy (J.O.)

1254. Severe frost from January 1 to March 14.

1256. Year very stormy so that the cornfields perished, blackened and putrified in autumn. (J.O.)

1257. Continuous rains in summer and autumn. (J.O.)

1257-58. Not a single frost or fine day occurred nor was the surface of the lake hardened by frost, but uninterrupted, heavy falls of rain and mist obscured the sky until Purification (February 2). (M.P.)

1258. When April, May and the principal part of June had past scarcely were there visible any shooting buds of flowers. Many thousand human beings died of hunger. (M.P.)

1258. All kinds of corn nearly destroyed by the autumn rain. (J.O.)
1260. Long, great and severe drought.
1269. Great frost from November 30 to February 2.
1276-78. Hot long summers, drought. (Lowe)
1281-2. From Christmas to nearly February 2 was so much cold and snow that five arches of London Bridge were thrown down by the force of the ice. (W.R.)
1283. All the summer and great part of the autumn vehemently and continually rainy. (J.O.)
1290. This year were frequently inundations of rain and especially in summer and autumn. (J.O.)
1292. The February and winter was very severe. (J.O.)
1293-94. Excessively hot summers. (Lowe)

FOURTEENTH CENTURY.

The earliest known Journal of the weather in England is the Rev. William Merle's "Consideraciones Temperiei," a translation of which, prepared by Mr G. J. Symons, was published in 1891. The journal contains records of weather from January, 1337, to January, 1344, and the observations were made partly at Oxford and partly at Driby, in the northern portion of Lincolnshire, where Mr. Merle was rector. There were great famines in 1315-16 and 1327, and these are attributed to very wet weather. So far as the following extracts go, but they are, of course, not exhaustive, the period does not appear to have been particularly noteworthy as regards meteorological events, and the only references to exceptional years are shown in the two extracts (W.M.) below. The other extracts are from Adam Munmuth's Chronicle (M.C.); John de Oxenedes' Chronicle; Capgrave's Chronicle of England (C.C.); and Chronicon a Monacho Sancti Albani (C.M.).

1337. In January there was warmth, with moderate dryness, and in the previous winter there had not been any considerable cold or humidity.
1338-9. From the beginning of December came a very hard frost which lasted 12 weeks. (M.C.)
1340. In this year there was not much cold after the autumnal equinox. (W.M.)
1342. There was spring-like weather the whole time between September to the end of December. (W.M.)
1348. Mild and serene year: very mild in winter. (J.O.)
1348. There were grate reynes which dured fro the Nativite of Seynt Jon Baptist (June 24) onto Christmas. (C.C.)
1353. Great drought from the month of March until July. (C.M.)
1363. Severe frost from December 7 until March 19. (C.M.)
1369. The corn was greatly damaged by floods. (C.M.)

FIFTEENTH CENTURY.

The 1,600 pages of Mr. James Gairdner's edition of the Paston Letters, dated from 1422 to 1509, do not contain a single reference to the weather or to any kindred topic.

1407. There was a gret Wynter that dured both December, Januari, Februari and March that the most part of small birds were dead. (C.C.)-
1433-4. From November 24 until February 10, the Thames was frozen down to Gravesend.
1447 1473-74. Very hot summers. (Lowe).

SIXTEENTH CENTURY.

The most interesting year of the sixteenth century was 1594, which was unusually wet and unseasonable. The rains and floods of this year are believed to have been in Shakespeare's mind when writing "Midsummer Night's Dream," in Scene I of Act II, of which Titania describes the bad weather provoked by fairy brawls and says that—

"Through this distemperature we see
The seasons alter: hoary-headed frosts
Fall in the fresh lap of the crimson rose,
And on old Hiem's thin and icy crown
An odorous chaplet of sweet summer buds
Is, as in mockery, set. The spring, the summer,
The childing autumn, angry winter, change
Their wonted liveries, and the mazed world,
By their increase, now knows not which is which."

This reference has been used to fix the date of Midsummer Night's Dream at about 1592-1595. Authorities agree that the play was one of Shakespeare's early efforts.

There was great scarcity in England from 1581 to 1603, but the sixteenth century was not more marked by famines than other centuries. An exhaustive examination of wheat prices made by Dr. Farr in 1846 led to the conclusion that they were evenly distributed throughout the eleventh to the sixteenth centuries, about ten years of famine occurring in a century.

1506. Great frost: Thames frozen.
1515. Thames frozen throughout January.
1531. All description of corn gathered this year is still very moist, owing to the quantity of rain that has fallen. (State Papers).
1537. This year in December was the Thames of London all frozen over, wherefore the Kynges Majestie roade throughout the citie of London to Greenwich. (Hall's Chronicle).
1538-41. Hot and dry summers. (Lowe)
1564-5. Great frost until January 5. Thames frozen from London Bridge to Westminster.
1594. An unusually wet summer.

SEVENTEENTH CENTURY.

In the seventeenth century we begin to get systematic records of weather observations as well as numerous references in diaries and letters. A register of the weather kept by John Locke at Oxford in 1666-70, 1681-83, and at London in 1671-81, is given in Vol. V of Robert Boyle's Collected Works. The Diaries of Evelyn and Pepys are the two chief sources, as will be seen by the following extracts from them. Boyle makes the following references to the wet July of 1648 and the variability of the same seasons in different years.

> A prodigiously wet summer. July, 1648. Siege of Colchester. "How very unseasonable is this melancholy weather, and how tedious a winter have we endured this summer? . . . . among us, the confusions of our country seem to have infected our very air, and serenity is as great a rarity in the sky as in men's consciences . . . . and some begin to doubt whether our almanacks be not mistaken by calling this month July instead of November."—Boyle's Collected Works, II, 178).
>
> "The difference we find in seasons, that bear the same name, and should be alike in temperature, is oftentimes very great, and sometimes also very lasting . . . . now and then I have observed in the same

months and days [March, April, and May] at no great distance from one another, that the weather has been sultry hot, and has also produced a great snow. We have seen summers like that which is remembered for the siege of Colchester [1648], that for almost the whole season were more dark and rainy than several winters have been observed to be. To which purpose I remember that when I was about to write the history of cold [1662], I was fain to watch a whole winter to find two or three frosty days, to make an experiment I had need of, that required not a cold that was either lasting or very intense."—(Boyle's Collected Works, IV, p. 285).

1607. Severe frost, from December 22 until February 2. Thames frozen.
1608. Thames frozen in January.
1609. Thames frozen.
1620. Thames frozen.
1622. All the rivers of Europe frozen. (Lowe)
1636. This year being extremely dry the pestilence much increased. (E.)
1648. This was a most exceeding wet year, neither frost nor snow all the winter for more than six days in all. (E.)
1649. Jan. 22. Now was the Thames frozen over. (E.)
1652. June 25. After a drought of near four months there fell a violent tempest of hail, rain, wind, thunder and lightning. (E.)
1658. March. This had been the severest winter that any man alive had known in England. (E.)
1659. Very rainy year. (P.)
1660. Jan. 21. It is strange what weather we have had all this winter: no cold at all. (P.)
1661. June 12. A Form of Prayer was published on account of the late immoderate rain and waters. (P.)
1662. Jan. 15. Great rain had fallen without any frost or seasonable cold. (E.)
1662. Jan. 26. A fast day ordered by Parliament to pray for more seasonable weather, it having hitherto been summer weather. (P.)
1662. Jan. 27. The warm weather all this winter makes us fear a sick summer. (P.)
1662. Nov. 28. A very hard frost, after having none almost these three years. (Continued to Dec. 12. P.)
1663. Aug. 28. Cold all night and this morning, a very great frost they say, abroad, which is much, having had no summer at all, almost. (P.)
1664. This year have had the most thunder and lightning they say of any in man's memory. (P.)
1665. March 26. The last winter hath been as hard a winter as any have been these many years. (P.)
1666. Oct. 21. This season, after so long and extraordinary a drought in August and September, as if preparatory for the dreadful fire, was very wet and rainy. (E.)
1667. Jan. 1. The Thames covered with ice. (P.)
1668. The most summer weather that ever was seen. (P.)
1679. Very hot, no rain from May, all summer. (Lowe)
1681. May 25. There had scarce fallen any rain since Christmas. (E.)
1681. June 12. It still continued so great a drought as had now been known in England. (E.)

1683. Dec. 23. The Thames frozen. Frost for 13 weeks. (E.)

1684. Feb. 8. The Thames still frozen. (E.) (This winter is vividly described in "Lorna Doone.")

1684. July 2. An excessive hot and dry spring, and such a drought as never was in my memory. (E.)

1684. Aug. 10. Such a drought as no man in England had known. (E.)

1685. May 24. We have not hitherto had any rain for many months. Such two winters and summers I had never known. (E.)

June 28. We had now plentiful rain after two years excessive drought and severe winters. (E.)

1686. Jan. 19. So wet and mild a season had scarce been seen in man's memory. (E.)

1688-9. Severe frost from December 20 to February 6. Thames frozen.

1690. Jan. 11. This winter has been hitherto extremely wet; warm and windy. (E.)

1691. Nov. 8-30. An extraordinary dry and hot season without frost and like a new spring such as had not been known for many years. (E.)

Dec. 26. An exceeding dry and calm winter: no rain for many past months. (E.)

1692. July 25. This whole summer was exceeding wet and rainy; the like had not been known since 1648, whilst in Ireland they had not known so great a drought. (E.)

1693. Feb. 19. An exceeding warm winter, such as has seldom been known. (E.)

Very wet spring and summer. (E.)

1695. April 14. A most severe cold and snowy winter without almost any shower for many months. (E.)

1695. Aug. 11. The weather now so cold that greater frosts were not always seen in the midst of winter: this succeeded much wet. (E.)

1696. Sept. A great harvest after a cold, wet summer. (E.)

Dec. 13. Continuance of extreme frost and snow. (E.)

1697. Feb. 7. Severe frost continued with snow. (E.)

1698. May 8. An extraordinary great snow and frost. (E.)

1699. June 25. The heat has been so great almost all this month that I do not remember to have felt much greater in Italy; and this after a winter the wettest though not the coldest that I remember for 50 years. (E.)

Dec. 3. Bright and warm as in the middle of April; and so continued to January 21. (E.)

EIGHTEENTH CENTURY.

Evelyn's Diary, Horace Walpole's Letters, and Gilbert White's Selborne are the chief sources drawn upon for observations of the weather in the eighteenth century, but we now get more actual measurements. Rainfall records were obtained at Crane Court, London, from 1729 to 1735, and there is a continuous series of such observations in London from 1774. General remarks, therefore, have not now the same importance as formerly.

1700. April 24. A most glorious spring. (E.)

1701. April 11. A great dearth, no considerable rain having fallen for some months. (E.)

1703. June 11. Rains have been great and continual, and now near midsummer cold and wet. (E.)

1705. March—June. The season very dry and hot. (E.)

1708-9. Severe frost for many weeks (December to March).

1715-16. Severe frost. Thames frozen (Nov. 24 to Feb. 9).

1739-40. Great frost began on December 24 and lasted till February 17, when it began to break up. Thames frozen.

1742. Severe frost for three weeks from December 18.

1750. Remarkably fine summer.

1759. Most gorgeous of all summers. One would think we had plundered east and west of sunshine. (H.W.)

1761. It has rained incessantly. (H.W.)

1762. A very fine summer.

1763. Deluges of rain. (H.W.)

1766. The spring is very wet and cold. A succession of rains in spring, summer and harvest. (H.W.)

1767. Jan. 21. We have had a most dreadful winter, the coldest I ever remember, for you know I was with you in 1740 and 1741. (H.W.)

1768. The most severe frost (Jan. 1-14) that we had then known for many years (G.W).

1770. Are you not in despair about the summer? It is horrid to be ruined in coals in June and July. (H.W.)

1773-4. A very wet autumn and winter. (G.W.)

1775. April 11. I wish the seasons came a little oftener into their own places instead of each others. From November till a fortnight ago we had warmth that I should often be glad of in summer (H.W.)

1776. Jan. 7—Feb. 1. Very severe frost and heavy snow. On January 31 at Selborne, " the quicksilver sank exactly to zero, being 32° below the freezing point." (G.W.)

1776. Thames frozen, Jan. 27—Feb. 17. (G.W.)

1778. A very fine summer.

1781. Unusually hot and dry summer. (G.W.)

1782. We have had the most deplorably wet summer that ever I remember. (H.W.)

1783. Unusually hot and dry summer. The country round was continually harassed with tempests and thunderstorms. (G.W.)

1783-4. Frost began on December 10 and continued for 63 days. (G.W.)

1784-5. Vast snow and severe frost (Nov. 25—Jan. 3). On January 10 the quicksilver went down to one degree below zero at Selborne. Thames completely frozen over below London Bridge. (G.W.)

1788-9. The Thames frozen below bridge; and booths erected on it.

1791. Frost and snow in different parts of England at midsummer.

1794-5. Hard frost of many weeks. Began about middle of December and continued until end of March. Thermometer at London December 24. Intense cold on Christmas Day.

1795-6. Severe frost. Thames frozen.

1796. Thermometer went down to —6° in the environs of London, December 24. Intense cold on Christmas Day.

1798-9. Severe frost December and early part of 1799. Thermometer reached 5°.

1813-14. Most severe frost commenced December 27 and broke up
February 5. Thames and other large rivers frozen.

Two points must be borne in mind in connection with the frequent references in the foregoing extracts to the Thames being frozen. One is that in former times the arches of London Bridge impeded the flow of the river, and were easily blocked with ice. Another point is that, on account of the change from the Julian to the Gregorian Calendar in 1752, a difference exists of eleven days in all dates. For example, Christmas Day now occurs earlier than it did in the season, and all festivals are correspondingly affected as regards their places in seasons.

(To be concluded in the next number).

The attention of students interested in man's relation to his environment may be called to an interesting paper by Prof. Arthur Thomson and Mr. L. H. Dudley Buxton in the Journal of the Royal Anthropological Institute, 1923 (Vol. LIII, pp. 92 ff.). It deals with man's nasal index in relation to certain climatic conditions and the searching out of climatic data has been thoughtfully done by Mr. H. O. Beckit. The nasal index is the ratio of breadth to length measured from determined points and expressed in percentages which, for different stocks, range from about 58 to 105 for the living head and from 40 to about 63 for the skull. The authors are able to show an interesting relation as follows :—

Nasal index (living)—Mean Annual t° x 0.483) + (av. rel. humidity
x 0.253) + 24.91.

Broad flat noses are thus characteristic of warm moist climates, and the converse. The authors recognise both our imperfect information as to even the climatic data considered and the need for much more sifting of climatic factors, and the gaps in our information about nasal form.

The relation of nasal form to breathing and to general activity and efficiency is worth pondering.

It is obvious from the figures the authors give that a stock moving from one region to another, takes its nasal form with it and modifies it but slowly at most.

The *Manchester Guardian,* to which thoughtful geographical teachers turn for information on many matters of commercial and international importance, published (22-12-23) an interesting table of the reduction of cotton acreage this year in the United States of America. The acreage abandoned is as much as 4.6 per cent. of the whole and this is no doubt a reflection of the reduction of the world's purchasing power. We give the percentage reductions of acreage as mentioned in the newspaper, as also the consequent number of bales to be deducted from estimates of yield :—

Virginia	0.5	50	Mississippi	8.1	615	Missouri	10.0	115
N. Carolina	0.5	1020	Louisiana	4.0	365	Oklahoma	8.0	620
S. Carolina	2.0	795	Texas	2.0	4290	California	1.0	49
Georgia	11.0	590	Arkansas	5.0	620	Arizona	3.0	83
Florida	15.0	12	Tennessee	4.5	220	Other	14.0	37
Alabama	3.5	600						

U.S.A. 4.6 10,081.

These figures show the heavy percentage decrease in districts that are "marginal" for the cotton crop, e.g., Florida, Georgia, Missouri, Oklahoma and "Other," and the greater tenacity of the cultivation scheme in such great areas for it as the Carolinas and Texas. California and Arizona, a newer and separate region for commercial cotton, show that the "marginal" factors of decrease affect them less.

THE TEACHING OF GEOGRAPHY IN ELEMENTARY SCHOOLS.

BY ERNEST YOUNG, B.Sc.

II. STUDY THE WHOLE WORLD.

WHEN one considers that the elementary school period extends from five to fourteen years of age it is rather deplorable that any child should leave school having omitted any part of the world from its geographical studies. Thousands of children know nothing say of Japan or Egypt or Brazil, not for want of time but for want of forethought. There are schools where a whole year is given to England and another to Scotland and Ireland. In an elementary school one year is quite sufficient for all that need be taught about the British Isles. Then I have known Canada attended to twice, once in a course on North America and again in a course on the British Empire. If all this overlapping and waste were saved there would be plenty of time to go everywhere and see everything.

It is necessary to go everywhere; in an inter-dependent world like ours none of us can afford to neglect the existence of anybody else. Moreover, all the separate bits of the world fit together and it is rarely possible to understand one of the bits without some knowledge of the whole. That is why it is silly for instance to teach India and omit the rest of Asia.

It is not the duty of any teacher or writer to prepare syllabuses of work for lazy people, but as it is easier to describe what is in my mind by assuming a syllabus, some kind of syllabus is here assumed.

Difficulties arise at the very beginning; we can only realise the unknown in terms of our own experience. Hence artists always paint angels as human women with the additions of birds' wings. Because of this limitation of our imaginations a child should begin its geography at home. At the same time the home is unintelligible without some knowledge of the world in which that home is situated. The solution of the difficulty is probably to run two series of lessons side by side, the home geography, at this early stage being largely observation of nature, real Nature Study, not the miserable substitute that does duty for it inside four walls from which Nature has been entirely banished.

The World Geography can be taken in more ways than one. "The main object will be to awaken the children's interest in the lives and habits of the people and to compare with these the lives and habits of other nations and other peoples living amongst different surroundings."* The child should also get an impression of the variety and interest of the world, but an impression that is orderly, systematic and useful as a base for further study. Therefore, in these preliminary world lessons (say Standards I and II) "an attempt should be made to include typical scenes from the main climatic regions of the world."*

The number of such regions and the amount of detail attempted is a matter for the teacher. But they should certainly be numerous enough to cover typical environments from the pole to the equator. They will, therefore, include the cold desert, the hot desert, types of grassland such as prairie, steppe and savana, the equatorial forest and the temperate forest.

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*Board of Education. *Suggestions for the Teaching of Geography.*

The information can be given in connection with lessons on :—

Child Life in the various areas;
Adult Life in the various areas;
The typical products of various areas;
Tales of adventure and discovery by land and sea.

In a rural school with two classes in the same room, two of these courses could be easily and logically alternated, e.g., Life with Products, Products with Adventures, and so on. In this case the world is studied twice in the first two years and much useful knowledge is driven home by repetition but the child is usually unconscious of the fact that it is travelling a second time over more or less the same ground.

In the next four years the whole world will be done again but in greater detail. For the first of these four years we would suggest the British Isles. Here the results of much of the observational work of the two preceding years can be utilised, fresh forms of observation attempted and more difficult ideas introduced.

This leaves us with three years in which to study all the continents in broad outline and with attention to only the most important facts. These facts should be learned in systematically related order and should illustrate fundamental principles and phenomena. Each year should take a section of the globe from north to south, e.g., the two Americas, or Euro-Africa, or Asia-Australasia. The advantage of such treatment is that in each of these north and south strips it is possible to see the operation of similar causes producing similar results on either side of the equator and to use the knowledge acquired in one strip when studying the next.*

For instance the succession of wind belts, rain belts, vegetation belts, etc., is fairly regular except for Asia. The west coasts of the Americas and Euro-Africa present almost exactly similar repetitions.

As Asia offers certain exceptions to the general arrangement elsewhere it should probably come last and as the Americas show the interaction of wind, rain, etc., very simply and without violent exceptions they should probably come first, but there are differences of opinion on this point. It is possible to cover all the continents in the second and third years of the four year course, if everything concerning Europe be left out of the Euro-Africa strip except a few leading features about climate, etc. This has the advantage of allowing the whole of the fourth year of the course for the study of Europe. By this time the pupils will be prepared to examine with profit such ideas as "country" and "nation" and to take an intelligent interest in the political geography of Europe.

In many schools there will be pupils (probably in Standards VII or ex-VII) who can add a fifth year to the above course. This last year should be devoted to a wide general survey of the whole world again. It may take the form of (a) a course on the British Empire and its relation to other parts of the world : as the Empire is so extensive and so widely scattered scarcely any part of the world can escape mention, (b) a course in economic geography when the production, manufacture and distribution of the great world commodities can be studied, all the main principles of climate, vegetation, etc., revised, the inter-dependence of the whole emphasised and a certain amount of very elementary economics introduced.

The teacher who thinks that this type of syllabus is too ambitious has not realised the fact that one of his chief duties is to learn to omit, to reject in fact, everything but the absolutely essential. Whether much or little be taught about this or that area, children should not leave school before they know that there really is a whole round world.

*For a full discussion of this point see *A Scheme for a First Course in Geography.* Geographical Association. 7d. post free.

THE GEOGRAPHICAL ASSOCIATION.
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PROGRAMME OF SUMMER TOURS, 1924.

BRITISH TOURS.
(By Motor Coach).

TOUR No. 1.—July 26th to August 4th inclusive. (Starting from BRADFORD).

Ten Days Tour to The West Coast of Scotland, The Scottish Highlands, and The English and Scottish Lake Districts.

Conducted by E. E. LUPTON, Esq., F.R.G.S.

1st Day.—Bradford, Aire Gap, Ribblesdale, Lonsdale, Shap Fells, Eden Valley, Carlisle.
2nd Day.—Dumfries, Castle Douglas, Newton Stewart, Wigtown Bay, Glenluce, Stranraer.
3rd Day.—West Coast of Wigtownshire and Ayrshire, Girvan, Ayr, Burns' Country, Glasgow.
4th Day.—The Clyde, Helensburg, L. Lomond, Crianlarich, Dalmally, Pass of Brander, Oban.
5th Day.—Loch Awe, Glen Dochart, Glen Ogle, Pass of Leny, Callander.
6th Day.—Loch Katrine (Trossachs), Lochearnhead, Killin, Loch Tay, Aberfeldy, Pitlochry, The Pass of Killiecrankie.
7th Day.—S. Highlands, Sidlaw Hills, Perth, The Ochils, Stirling, Bannockburn, Edinburgh.
8th Day.—Half-day at Edinburgh, thence to Melrose, Selkirk, Ettrick Vale, St. Mary's Loch, and Moffat.
9th Day.—Beattock, Annandale, Gretna, Carlisle, Keswick, The English Lake District to Ambleside.
10th Day.—Windermere, Grange-over-Sands, The Pennines, Ingleton, Settle, Ilkley, Bradford.

Inclusive Fare for this Tour:—

Members, £15. Non-Members, £16.

The fare includes Motor, First Class Hotel Accommodation, All Meals, and All Gratuities.

For **Conditions of Booking** and **Booking Fees** see following pages.

TOUR No. 2.

8 Days' Tour through "The Natural Regions of Central and South Britain"

(including the Marches of Wales).

August 6th (Wednesday) to August 13th inclusive. Starting from BRAFORD).

Conducted by

1st Day.—The Pennines, Chester, Llangollen, Shrewsbury.
2nd Day.—Welsh Border, Ludlow, Hereford, Ross-on-Wye.
3rd Day.—Lower Wye, Tintern, Chepstow, Gloucester, Cotswolds, Bath.
4th Day.—Mendips, Cheddar, Wells, Sedgemoor, Yeovil, Dorset Downs, Bournemouth.
5th Day.—New Forest, Winchester, Bagshot Heath, Windsor.
6th Day.—Stoke Poges, Burnham Beeches, Henley, Chilterns, Thames Valley, Oxford.
7th Day.—Aylesbury, Bedford, Huntingdon, Fenland, Peterborough.
8th Day.—Midland Plain, Nottingham, Dukeries, S. Yorkshire.

Inclusive Fare:—Members, £12; Non-Members, £13.

WHIT-WEEK TOUR. June 7th to June 16th inclusive. (Starting from BRADFORD).

At the request of a few Members and friends the following Tour is arranged:—

"Nine Days' Tour to The South and West of Britain, including The Hampshire and Dorset Coasts, Central and North Wales."

Conducted by E. E. LUPTON, Esq., F.R.G.S.

1st Day.—Bradford, Doncaster, The Dukeries, Nottingham, The Midland Plain, Fenland, Peterborough.
2nd Day.—Valley of the G. Ouse, Bedford, Woburn Park, The Chilterns, Tring, Amersham, OR via the Vale of Aylesbury, to Oxford.
3rd Day.—Windsor, Ascot, Bagshot, Basingstoke, Winchester, The New Forest, Christchurch, Bournemouth, OR via The Thames Valley, Goring Gap, Panybourne, The Downs, Winchester, New Forest, Bournemouth.
4th Day.—Half-day at Bournemouth. Afternoon ride to Poole, Wareham, The Purbeck Hills to Lulworth Cove, and back to Bournemouth.
5th Day.—Blandford, The Stour Valley, Sherborne, Yeovil, Ilchester, Glastonbury, Wells, The Mendips and Cheddar to Clifton (Bristol).
6th Day.—The Severn Plain and the Cotswolds, Gloucester, Ross, The Wye Valley, Hereford, Leominster, Ludlow.
7th Day.—Newtown and the Severn Valley, Carno, The Dovey Valley, Machynlleth, Corris, Tal-y-llyn, Cader Idris, Dolgelley, Barmouth.
8th Day.—The Coast of Cardigan Bay, Harlech, Portmadoc, Pass of Aberglaslyn, Beddgelert, Snowdon, Carnarvon, Bangor, Conway, Colwyn Bay.
9th Day.—Vale of Clwyd, Rhyl, St. Asaph, Holywell, Hawarden, Chester, The Cheshire Plain, Altrincham, Stockport, Longdendale, The S. Pennines, Huddersfield, Bradford.

N.B.—Early application for places on this tour is essential. Many places are already booked.

Inclusive Fare:—Members, £13 10s.; Non-Members, £14 10s.

This includes Motor Fare, Accommodation at First Class Hotels, All Meals, and All Gratuities.

(For **Booking Fee** see "**Conditions of Booking**").

FOREIGN TOURS.

TOUR No. 3.

"23 Days' Tour to Lucerne and The Bernese Oberland,"

August 4th to August 26th inclusive.

Conducted by P. H. L'ESTRANGE, Esq., B.A.

	ITINERARY.	NIGHT AT
Aug. 4th.	—Leave London, 2-0 p.m.	
,, 5th.	—Arrive Lucerne. Visit to Glacier Garden, etc.	Lucerne.
,, 6th.	—Excursion to Rigi or Pilatus.	,,
,, 7th.	—Excursion to Burgenstock.	,,
,, 8th.	—Steamer to Tell's Platte. Walk along Axenstrasse to Fluelen; train to Wassen	Wassen.
,, 9th.	—Train to Göschenen; walk to Andermatt.	Andermatt.
,, 10th.	—Excursion to St. Gotthard Pass (motor optional).	,,
,, 11th.	—Excursion to Oberalp Pass.	,,
,, 12th.	—By diligence over Furka Pass to Gletsch.	Gletsch.
,, 13th.	—Visit to Rhone Glacier.	,,
,, 14th.	—By diligence over Grimsel Pass to Meiringen.	Meiringen.
,, 15th.	—Visits to Aar Gorge and Reichenbach Falls.	,,
,, 16th.	—To Interlaken and Lauterbrunnen.	Lauterbrunnen.
,, 17th.	—Excursion to Murren, return via Stechelberg.	,,
,, 18th.	—Visit to Trümmelbach Falls and upper part of valley.	,,
,, 19th.	—Excursion to Wengen.	,,
,, 20th.	—Train to Klein Scheiddeg, visit Eiger Glacier and snow-field, walk to Grindelwald.	Grindelwald.
,, 21st.	—Excursion to Băregg Hut and Lower Glacier.	,,
,, 22nd.	—Walk to Manlichen—train from Kl. Scheiddeg.	,,
,, 23rd.	—Ascent of Faulhorn.	,,
,, 24th.	—Walk to Grosse Scheidegg—visit Upper Glacier and Ice Grotto.	,,
,, 25th.	—Visit to Lütschen Gorge. Leave Grindelwald.	
,, 26th.	—Arrive Victoria (London) 3-20 p.m.	

TOUR No. 4.

"23 Days' Tour to The Swiss Engadine and Lake Como, etc."

August 4th to August 26th inclusive.

Conducted by Dr. NAEGELI (University of Zurich.

ITINERARY.	NIGHT AT
Aug. 4th.—Leave London (Victroria, S.E. side), 2-0 p.m.	
,, 5th.—Arrive Zurich. Sight seeing.	Zurich.
,, 6th.—Walk or train to Uetliberg. Train to Arosa.	Arosa.
,, 7th.—Falk to the Aelplisse. Afternoon walk to Maran.	,,
,, 8th.—Ascent of Weisshorn.	,,
,, 9th.—Over the Urdenfuerkli to Parpan; motor car to Tiefenkastel; train to Pontresina.	Pontresina.
,, 10th.—Rosegg Glacier (train optional).	,,
,, 11th.—Bernina Pass (train) Sassal Masone Alp; Palue Glacier to Alp Gruem Station, train to Pontresina.	,,
,, 12th.—Muottas Murail (train optional).	,,
,, 13th.—Diavolezza, Morteratsch Glacier (with guide) train back to	,,
,, 14th.—Half-day's walk to St. Moritz.	,,
,, 15th.—Fuorcla Surlej to Silvaplana or Sills.	Silvaplana.
,, 16th.—Rowing on Lake Silvaplana or Sils.	(Sils).
,, 17th.—Walk to Fextal and Fex Glacier.	,,
,, 18th.—Morning walk to Marmorè. Afternoon walk to Chastè.	,,
,, 19th.—Pizdella Margna (for good walkers).	,,
,, 20th.—Maloja (motor boat), Lake of Cavloccio, back to Maloja, walk along Lake to Sils.	,,
,, 21st.—To Maloja and Chiavenna (diligence).	Chiavenna.
,, 22nd.--Train to Colico; Steamer to Bellagio.	Bellagio.
,, 23rd.—Morning to Serbelloni (beautiful park); Afternoon Boat to Villa Carlotta.	,,
,, 24th.—Steamer to Como. Train to Lucerne.	Lucerne.
,, 25th.—Lucerne, Glacier Garden, etc. Leave for England.	
,, 26th.—Arrive Victoria, 3-20 p.m.	

Inclusive Fares:—Tour No. 3, Members, 25 gns.; Non-Members, 26 gns.
Tour No. 4, Members, 26½ gns.; Non-members, 27½ gns.

N.B.—These fares are subject to the party numbering at least 25; if less than that number, One Guinea more will be charged.

The fare includes 2nd Class Travel, 1st Class on Steamers, 3rd Class on Mountain Railways; Full Hotel Accommodation at Superior Hotels; All Meals, All Gratuities, Kurtax, and conveyance of luggage where necessary, and services of Guides and Lecturers.

The tickets are valid for 33 days, and Members may extend their stay if desired up to that limit.

NOTE.—The walks are not too strenuous, and all walking or excursions are optional. At each centre and en route addresses and lectures will be given.

All further particulars of Tours 3 and 4 may be obtained from:—

Miss L. LEE, F.R.G.S., 'Melford,' Walpole Road, Boscombe, Bournemouth.

(Enclose stamped addressed envelope for reply).

TOUR No. 5.

15 Days to "The Paris Basin and the Backgrounds of its Life in Brittany and Normandy."

August 1st to August 15th inclusive.

Conducted by Miss S. HARRIS, F.R.G.S.

(Assistant Lecturer in Geography, University College of Wales, Aberystwyth).

ITINERARY.	NIGHT AT
Aug. 4th.—London to Southampton. Steamer to Cherbourg. Train to Dinan.	Dinan.
,, 5th.—Excursions to Mt. St. Michel and St. Malo.	,,
,, 6th.—At Dinan. Train to Morlaix.	Morlaix.
,, 7th.—At Morlaix. Visit to Roscoff. Train to Quimper.	Quimper.
,, 8th.—Morning at Quimper. Afternoon train or motor to Lorient.	Lorient.
,, 9th.—Visit to Carnac. Afternoon to Vannes.	Vannes.
,, 10th.—Vannes—Angers—Tours.	Tours.
,, 11th.—Tours—Blois—Chartres.	Chartres.
,, 12th.—At Chartres. Chartres to Paris.	Paris.
,, 13th.—In Paris and environs.	Paris.
,, 14th.— ,, ,,	,,
,, 15th.—Paris to Rouen.	Rouen.
,, 16th.—At Rouen.	,,
,, 17th.—Rouen to Le Havre and England.	

For further particulars of this tour apply to Miss S. Harris, Dept. of Geography, 11, Marine Terrace, Aberystwyth. (Enclose stamped envelope for reply).

CONDITIONS FOR BOOKING, &c.

1. The number of passengers on the British Tours is limited to 24 per tour, and bookings are accepted in strict order of application. Each tour will be accompanied by a Lecturer, who will give his services in indicating and explaining all the interesting Geographical problems, etc., met with en route.

2. Every care will be taken to ensure the safety and comfort of the Members, but it must be understood that no liability whatsoever is accepted by the Committee for loss of tickets, luggage, or other property; nor for personal injuries or sickness occasioned by accident, weather, detention or any other cause.

3. The Programme and Routes will be adhered to unless there are urgent reasons to the contrary; but the right to alter any of the routes is expressly reserved if considered expedient. It is impossible to guarantee that any particular route will be followed, or that accommodation will in every case be found at the particular hotel advertised.

4. Special accommodation is provided on the Motor Coaches for luggage, but the Committee accepts no responsibility in any form for the conveyance or safety of members' luggage. It is strongly urged that hand luggage only be taken. The parties cannot on any account be delayed for the convenience of members bringing unwieldy luggage.

5. A Booking Fee of **FIVE POUNDS** is required at the time of Booking; the balance to be paid **one month** before the date of the commencement of the tour.

6. If, owing to unforeseen circumstances, a tour should be abandoned by the Committee, all payments will, except otherwise stated, be returned in full.

7. Members who have urgent reasons for withdrawal, may generally do so, except where otherwise stated, up to within one month before the tour commences for which entry has been made. If a substitute can be provided the deposit may be returned in full. Otherwise a fee of 10/- will be retained for cancellation expenses.

8. Intending passengers are asked to communicate as follows:—
   (a) For further particulars and itinerary of the Swiss Tours to
   Miss L. LEE, F.R.G.S., 'Melford,' Walpole Road, Boscombe, Bournemouth.
   (b) For particulars of the French Tour to
   Miss S. HARRIS, F.R.G.S., 11, Marine Terrace Aberystwyth.
   (c) For particulars of the British Tours, etc., and **ALL BOOKINGS FOR ALL TOURS** to **Mr. E. E. LUPTON, F.R.G.S.,**
   73, Bierley Lane, Bradford, Yorks.

(Enclose stamped addressed envelope for reply).

A PRACTICAL TEACHING NOTE.

By H. W. Howes, B.A.

THERE are many teachers who find it profitable to use the daily paper to assist them in their work. In the teaching of Geography it becomes essential.

The experiences of a teacher of Geography in reference to one column that regularly appears, may be of some interest. Each day the movements of steamships are recorded, generally from information supplied by Lloyds. The writer has found that this can be made to provide quite a number of very interesting exercises. In the following lines a few of these are outlined.

(a) The scholars draw a map of the World on a large scale.

(b) On a given day a certain number of scholars are detailed to pick out from the "Shipping News" the names of ships, and are told that each will be responsible for following the course of one of the vessels.

(c) In class little flags will be made, and attached to pins. On each flag will be written the name of one of the ships chosen.

(d) Day by day the pins will be moved as the various ships proceed on their voyages. On the map will be printed the names of the chief ports of call, but only as they are discovered by the movement of the pins.

(e) In course of time the responsible scholars will draw rough sketch-maps of the various routes, after which they will write an account of the courses taken, laying stress upon such matters as ports of call, coaling stations, probable cargoes and the reasons why they are brought from and to certain places. In the case of plants cultivated for commerce something would have been written about climatic conditions. This will lead to another essay on the physical, combined with the climatic, control of commerce. Yet another account could be written, of the peoples of the various places visited.

(f) The map can be completed by the inking in of the routes, and the insertion of the distances from port to port.

At the end of a given period, approximately when the ships have completed outward and homeward voyages, other scholars can draw a fresh map, and, by choosing ships on other tracks, can continue the work.

An alternative method is for more than one map to be used at the same time. In that case all may participate. This would also surmount an obvious difficulty, namely, that voyages vary in duration. It would help, too, if short distance ocean journeys were put on a separate map.

Finally, the teacher might find it worth while to make this scheme continuous. This is easily done, for when a child has followed the double voyage of a vessel he or she can trace the track of another on a different route.

[The author of this brief note has written a useful little text book for junior scholars—*Ocean Highways*, published by Messrs Wheaton of Exeter.]

AN ETHNO-GEOGRAPHICAL ESSAY ON BASUTOLAND.

By R. U. Sayce, M.A.,
Natal University College, Pietermaritzburg.

THE present essay is the result of a vacation spent in Basutoland during December, 1921, January and February, 1922. The writer's first intention was to study the transhumance customs of the Basuto, but on commencing investigation, it at once became clear that these customs could only be explained by taking into consideration other aspects of the people's activities. Their occupations are of course greatly influenced by their external, natural environment, but they also re-act one on the other. The extent and the type of agriculture are intimately associated with, and modify, pastoral conditions. No study of Basuto stock raising would be intelligible, without taking into account their agricultural development. Moreover the human response to environment is infinitely varied, and is constantly changing. No two valleys are exactly alike. Each one has its own proportion of arable soil, pasture and waste land. It will follow, therefore, that each valley will produce human re-actions slightly different from those of another valley, and that these re-actions will change as the numbers of the people and their stage of development change. Both the country and the people of Basutoland are undergoing important, and even rapid, change.

In order to study conditions at first hand, the writer used Maseru as a base, from which to make excursions of about thirty miles radius during December. Then, accompanied by a guide, an interpreter, and the necessary ponies for carrying a tent and baggage, he rode southwards to the valley of the Orange River, followed this in a general way up to its junction with the Semena,* having ridden through Ongeluk's Nek, Qacha's Nek, and along the border to Bushman's Nek and Thamatuwe, then, turning westwards, passed Ntauti's Village, Lehaha la Sekonyani, Mosalimani, Mapoteng, and returned to Maseru by way of the Berea Plateau.

The information has been checked in conversation with missionaries, government officials, traders, and all classes of natives; and I should like to take this opportunity of thanking those friends, to whom I am indebted for much information and good advice, and whose kindly hospitality made my journey much easier than it would otherwise have been.

Geology and Topography.

The geological structure of Basutoland is very simple. The country consists of horizontal beds in the following sequence.

4. Drakensberg Volcanics, about 4,000 feet.
3. Cave Sandstone; 200-300 feet, approximately.
2. Red Beds,—sandstone.
1. Molteno Beds,—sandstones and shales.

They are traversed by dykes and sills of a fine-grained dolerite. The line representing the base of the volcanics is one not only of geological, but of human importance. It occurs nearly always at a little above or below 6,500 feet, and divides the country into two distinct areas, each with its own type of topography, soil, climate and productions. There is a sandstone, or lowland Basutoland, and a volcanic, or upland Basutoland. The distinction is also made by the natives, who invariably use the word Basutoland to denote the lowland area in the West, and refer to the volcanic uplands as the Malutis.

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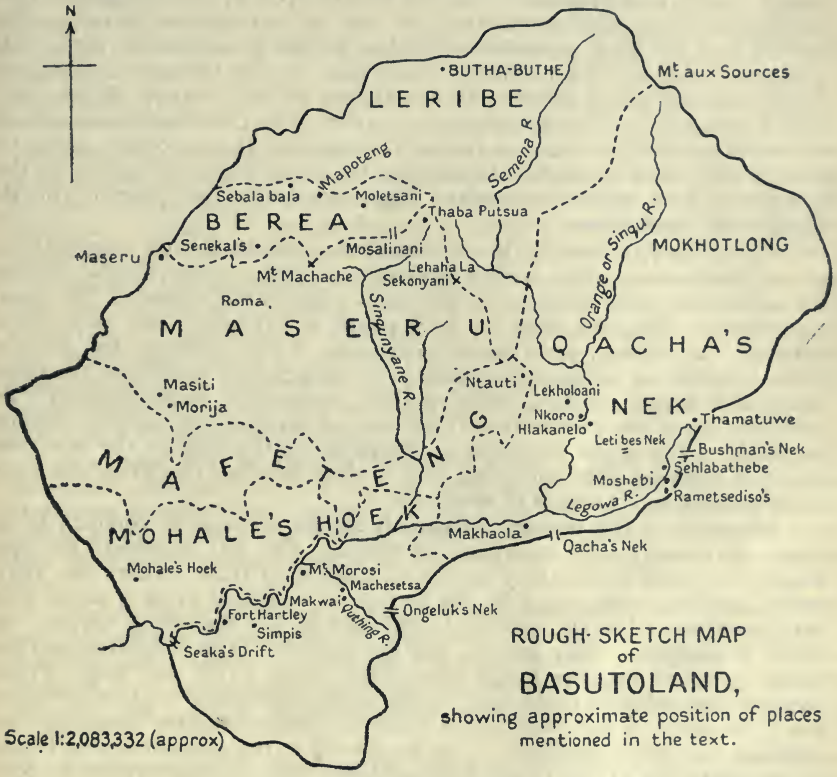
* All place names are taken from the 1:250,000 map, printed by the War Office, and based upon the reconnaissance survey of the late Major M. C. Dobson.

The volcanic beds form a large proportion of the country. This area consists of a maturely dissected plateau, whose highest point is Mont Aux Sources, 11,170 feet. It is a region of long, steep, grassy slopes, often bearing a strong resemblance to the Southern uplands of Scotland, or to parts of Central Wales. The rock disintegrates into a black, fertile soil, which is well watered, and produces excellent crops of wheat.



ROUGH SKETCH MAP of BASUTOLAND, showing approximate position of places mentioned in the text.

Scale 1:2,083,332 (approx)

The volcanic area is limited sharply on both the East and the West by great escarpments, which, seen from below, appear as mountain ranges, known as the Drakensberg and Malutis respectively. Here the scenery takes on a bolder and more picturesque aspect, the skyline reminding one of parts of Snowdonia, or the Cuillin Hills. About sunset the colouring, due to atmospheric effects, is wondrously beautiful, and the changes are very rapid. From near Roma, Mt. Machache appears now of an amethystine purple; a few minutes later it looks like a silhouette cut in a deep blue black velvet, set against a sky of faintly bluish silver.

Immediately below the volcanic beds comes the Cave Sandstone, underlain in turn by other sandstones, with subordinate shales. It is of a light creamy colour, and is remarkably free from jointing, or any well defined stratification. In texture and general appearance it resembles the Bath Oolite, and makes an excellent building stone, being especially when fresh, soft, and easy to work. This bed forms one of the most constant and prominent features of the country. Wherever it outcrops on a hillside, it gives rise to a nearly vertical, or even overhanging cliff, whose light colour stands out in sharp contrast with the grassy slopes above. Along its outcrop occur many caves, and rock shelters, which were occupied by the Bushmen, and which are frequently ornamented with their paintings, though many of these are being defaced by the native herd boys. In the West of Basutoland, the Cave Sandstone forms the Berea Plateau, which is the remains of a much larger one. The western lowland consists largely of lower beds, but is thickly dotted with prominent, isolated hills, capped by out-liers of the Cave Sandstone. Such hills are flat-topped, and are surrounded by steep cliffs, so that they are often accessible only by a few steep and broken paths. An excellent example is Thaba Bosiu, which was used by Moshesh as his great stronghold and headquarters. Mount Morosi on the Orange River is a similar instance, and has its own tale of battle. The Cave Sandstone extends into the Orange Free State as far as Thabanchu. It also occurs along the Orange River and some of its tributaries, the width of its outcrop decreasing upstream. It is visible close to the river, just below the junction of the Sinqu with the Semena.

The scenery, formed by the volcanic rocks, differs greatly from that due to the Sandstones. The former give rise to long, grassy slopes, whereas the sandstones form a series of terrace-like platforms, bounded by rocky escarpments. The rise from one such platform to another may be a matter of merely a few feet, or of several hundred. Again, whereas the areas of volcanic rocks are fairly well supplied with springs and brooks, as the result partly of a higher rainfall, partly of their comparative impermeability, the sandstone areas are frequently very deficient of surface water, and the springs are liable to fail in the dry season. European settlements on the sandstone are often supplied from boreholes, two to three hundred feet deep, the water being pumped up by means of windmills.

The paths of this country are exactly similar to those so common in the chalk areas, and on the moorlands of Britain. On flat surfaces, or comparatively gentle slopes, they consist of a sheaf of from twenty to thirty small, parallel tracks, worn by the feet of animals that avoid a much worn path, and proceed to cut another by the side of it. On steep slopes, the choice of footing is more limited, and the animals are concentrated into one pathway, which becomes much more deeply worn. On the long, grassy slopes of the uplands, paths tend to follow the contours, or, where a descent has to be made, a direction can be followed obliquely to the contours, thus avoiding very steep gradients. The trackways in the sandstone area consist of an alternation of practically level stretches, and of steep scrambles down rocky slopes. This is well illustrated by the paths close to the Orange River about Hlakanelo's. The main river and its tributaries have cut through the Cave Sandstone, with the result that travelling becomes a series of ascents and descents over rock surfaces, which are scarcely practicable to any but a Basuto pony.

Climate.

It is not possible to give any accurate account of the Basutoland climate. Records have been kept at a few stations only, and these cover no long period, and appear to be sometimes of doubtful accuracy. Apart from these we have to depend on observations based upon the experience of people who have lived long in the country. Since, however, the success of the crops depends on the dates of rains and frosts, popular attention has been turned in this direction, and the general opinion may be taken as an approximate indication of the time at which rains and frost may be expected.

The prevailing surface wind is from the south-west. This was markedly so during the three months which I spent in the country. Along the edge of the Drakensburg, rains and mist are often brought up by the south-east wind, but even at Qacha's Nek the chief rains seem to be brought by winds from the south-west, which supply the greater part of Basutoland with its rain.

The total rainfall from 1908 to 1920 at Leribe was 417.52 inches, giving an average annual rainfall of 32.12 inches, and at Mafeteng 347.00 inches, giving an annual average of 26.69 inches. The greater portion of the rain was distributed as follows :—

Leribe.		Mafeteng.	
January, 73.30 ins.	298.93 inches. or 71.1 p.c. of total.	January, 57.66 ins.	232.86 ins. or 67.1% of total
February, 71.40 ins.		February, 51.29 ins.	
December, 52.39 ins.		March, 47.80 ins.	
March, 52.17 ins.		December 45.09 ins.	
November, 49.67 ins.		November, 31.12 ins.	

From official meteorological data, two facts stand out clearly. Basutoland is an area of summer rain, about 70 per cent. falling between November and March. The northern districts have rather a higher rainfall than the southern. Though I have no figures to support me, it may be confidently stated that the volcanic uplands receive more rain than the western lowland.

Much of the precipitation takes place during storms of short duration. The run off is rapid, carrying away much soil, and the rivers often come down rapidly in spate, so that the traveller may find himself cut off between two rivers, and unable to proceed until they have subsided. Frequently precipitation takes the form of hail, bringing destruction to the crops. With the rapid melting of the hail, the rivers receive a sudden access of cold water, which may kill many of the fish.

A narrow strip of country along the eastern edge enjoys a climate somewhat different from the rest of Basutoland. Winds from the Indian Ocean are forced to rise sharply over the Drakensberg escarpment, and are cooled by expansion. The eastern border is characterised in summer therefore by a much cooler climate, and by a greater prevalence of cloud and mist.

During the latter half of January, I spent several days along this border, and was greatly refreshed by the coolness, accompanied sometimes by a drizzling rain. Later, on reaching a trading station at Malao's, on the Orange River, and about twenty miles from the border, I was told, on enquiry, that they had experienced the usual hot, sunny weather the whole while.

Basutoland is divided into the following districts and sub-districts :— Leribe, with its sub-districts of Leribe Peka and Butha-Buthe, Berea, Maseru, Mafeteng, Mohale's Hoek, Quthing and Qacha's Nek, with its sub-district of Mokhotlong.

Each of the districts, with the exception of Qacha's Nek, consists of a different proportion of upland and lowland, and, since the census returns are made out for each district, the natural divisions of the country are somewhat masked. Nevertheless, certain broad distinctions can be drawn by the study of the census figures.

Population.

The population is still largely concentrated in the low-lying western region, though this distribution is now undergoing important and rapid modification. Formerly the uplands were practically uninhabited, except during summer by those in charge of the flocks and herds. Now, however, the people are pushing inwards, and their permanent villages and cultivated fields are taking the place of the summer cattle-posts and grazing grounds. This will be more fully discussed in a later paragraph.

Agriculture.

The Basuto are, to a much greater extent than the Zulus, an agricultural people. Though they retain the pastoral fondness for cattle, and though the latter are still the currency in which lobolo is paid, the people are actuated in the main by agricultural considerations. The chief cause of quarrels is not cattle stealing, but trespass. All land belongs to the nation, and is held in charge by the chiefs, who allot to each man a certain amount of agricultural land, which is held in private possession from the time of sowing to that of harvest, after which it relapses into common land, and the stalks of maize and Kafir corn become common pasture. Kafir corn was originally the principal crop, and still the favourite one, but it is now rivalled in quantity by maize, and, of late years, wheat has been growing in importance. The latter crop will be considered separately.

Maize and Kafir corn flourish in the lower, western portion of Basutoland, and in the deeper and warmer valleys amongst the mountains. It can be said, with a fair approximation to the truth, that their serious cultivation is restricted to districts below the base of the volcanic beds. Here and there in a warm upland valley may be seen attempts to cultivate both these plants, but the harvest is always uncertain, owing to the occurrence of frost. The variety of maize requires about a hundred and eighty days to mature, while Kafir corn will not ripen in less than nine months after sowing, and is consequently more restricted in distribution than maize.

According to meteorological returns, the only months of 1920 and 1921 which were free from frost in lowland Basutoland were from November to April, inclusive. This period is considerably shorter in the mountains, where frosts are liable to occur as early as the latter part of March, and as late as November. Moreover cold snaps may happen in any month. At Christmas, 1920, snow was fairly general amongst the mountains, and there was a fall on December 21st, 1921. With this shortened growing season, maize, and especially Kafir corn, even if they are not killed by a late Spring frost, do not have time to be sufficiently mature before the Autumn frosts begin.

In riding from Letiba's Nek down to the Orange River one passes through a succession of crops. Above eight thousand feet cultivation is absent. Lower down one passes fields of wheat, which persist for some time. Then maize begins to appear, at first in small patches, and in the more sheltered spots. It is often in poor condition, and can scarcely serve any purpose other than to grow seed for next year. As one descends the maize crops improve and become more general, but it is only on reaching the Cave Sandstone that Kafir corn is seen in quantities sufficient to be worth mentioning.

In the volcanic uplands the only reliable crop is wheat, and this thrives splendidly. Of late years it has been grown in large quantities in the lowlands, not because the Basuto value it as a food, but because it can be exchanged with advantage for maize or Kafir corn, a bag of wheat being worth one and a half or two bags of the other grains. The exact amount, of course, depends on the fluctuations of the market. The chief wheat area, apart from the mountains where nothing else will grow, is the southern part of Maseru, Mafeteng and part of Mohale's Hoek. The explanation is partly political. Some years ago, Jonathan, the chief of the Leribe district, prohibited the growth of wheat, stating that he intended his district to remain a cattle area. It will be seen presently that the cultivation of wheat is more inimical to Basuto cattle raising, than is that of the other cereals. The rule is still in force though exceptions are made in the cases of favourite sub-chiefs and headmen; and, of course, some wheat has to be grown in the mountainous part of the district.

Wheat only enters into the diet of the people as a last resource. When they cannot grow Kafir corn or maize they exchange their wheat for these grains, and will frequently travel considerable distances to do so. Owing to the difficulty of transport, the population of some of the mountainous areas is being forced to use wheat for food, making it into a hard bread of great density. It is also being utilised for the production of a beer, which is sourer, and less to the native taste than leting or yoala.

There are no figures showing the actual production of each crop, but some idea of their relative importance can be got from the census figures, dealing with the number of bags imported into and exported from each district, during the year 1921.

	Berea.	Leribe.	L. Peka.	Butha Butha.	Maseru.	Mafeteng.	MoHale's Hoek.	Quthing.	Qacha's Nek
Export of Kafir Corn.	7477	7461	Included in Leribe.	511	3594	3	6	Nil.	7
Export of Maize.	7084	6315		696	4431	23	250	Nil.	35
Import of Kafir Corn.	50	Nil.		230	3517	5141	4192	922	1282
Import of Maize.	317	228		2195	4717	10,948	7806	3668	11,647
Export of Wheat.	13,798	7953		7251	27,202	13,306	6603	9548	3034

Maseru occupies a position, intermediate in several respects between the North and South. It apparently shares largely in the production of the three crops, but it must be remembered that it is the only railhead in the country, and that some of its imports and exports really belong to Berea or Mafeteng. It is quite clear that the northern districts, Berea and Leribe, are more than self-supporting, with regard to maize and Kafir corn. The mountain districts, such as Qacha's Nek or Mohale's Hoek, are forced to import large quantities. With them should be included Butha-Buthe, a mountainous sub-district of Leribe, and Mafeteng, which has specialised in wheat production. Leribe and Qacha's Nek are much the largest districts in Basutoland. The comparatively small amount of wheat exported from Leribe, which probably represents a great part of what is grown, is explained by political reasons. The figures for Qacha's Nek, and probably also for Mohale's Hoek, would be much higher, were the people not forced to use their wheat for food. The figures showing the import of wheat are practically negligible. The large amount of grain exported from the small district of Berea is probably due to the unusually large proportion of lowland to highland.

The transport difficulty is rather well illustrated by these returns. The populations of Mafeteng and Qacha's Nek are, approximately, sixty-seven thousand and sixty-six thousand respectively, but while Qacha's Nek imports rather more maize than Mafeteng does, its import figures for Kafir corn are only about a quarter of those for Mafeteng, and its export of wheat is less than a quarter. Maize made into a kind of porridge is a staple food, and maize must therefore be imported, but transport apparently undertakes only the necessities of life, and seems to check Kafir corn, from which leting and yoala (light and strong beer) are made. Mafeteng, with practically the same population as Qacha's Nek, transports into, or out of the district 18,447 bags of Kafir corn and wheat, as against the 4,316 bags of Qacha's Nek. Such a difference implies a great saving of transport animals, since it takes three oxen, or three horses, to carry two bags of grain.

The contrast between the uplands and the lowlands is very marked, and is accentuated by the short time necessary to pass from one to the other. From the cool, fresh air of the uplands, their black soil, running streams, their wheatlands and their silence, less than an hour's ride will take one into a land of sandstone and burning sunshine, a land with luxuriant crops of Kafir corn and maize. Here is a more numerous population, and the national leting is everywhere in evidence. As one rides along the bridle track, passing numerous villages, one gets the impression that the whole country is keeping a general feast day, such is the noise of chattering, laughter and singing that meets one at every turn.

Since the times of ploughing and of harvesting the crops, and the methods adopted determine the conditions of stock movement, it will be necessary to give a very brief sketch of the agricultural customs.

Kafir corn is generally sown in August or September, though it may be as late as October in the mountains, as is the case about Sehonghong. It takes about nine months to mature, and is harvested about May or June. Maize matures in six months. It is sown about November, and gathered in at the same time as the Kafir corn. The date of the wheat sowing varies considerably. The lowland wheat is ploughed in during Autumn, and reaped in Spring. In such low-lying areas as about Marija or Thaba Putsua and in Mafeteng, it is usually sown in April or May, and is ready for harvesting by November or December. On the Berea Plateau, about Senekals, sowing does not take place until June, the crop is then cut in January or February. In the mountains wheat is not sown until Spring, generally in October: it will be reaped about March.

The primitive hoe has been largely replaced, especially in the lowlands, by the plough drawn by oxen. Ploughing is done by the men, the women being relieved of so much hoeing. All men owe service to their chief. They are called upon whenever he requires any labour. Women are exempt from this service. The men called up for ploughing the chief's lands, are generally those living within reasonable distance of his property, since they have to bring their own ploughs.

The weeding and hoeing of all private lands is essentially the work of women, who may be helped by a few old men. Each woman is responsible for the cleaning of her husband's lands. Sometimes she is assisted by a number of her women friends, whose only payment is leting, which she has brewed. The lands of the chief are weeded and hoed by men called up for the purpose. These men take their own hoes, and often have a long day's ride to reach the scene of their labour. They supply their own horses and food. During the work meat and leting used to be, and still may be supplied them by the chief; but in many cases the chiefs are nowadays omitting to do this, and there is a growing discontent at the custom of obligatory labour.

Everyone joins in the harvest, though men alone are called upon to gather in the chief's crop. The heads of the maize and Kafir corn are gathered by hand, but wheat is reaped with a sickle. In years of good harvests, reaping machines may be sent over the border from the Orange Free State, and hired to the natives. The produce is stacked in the lands to be threshed. A circular piece of ground, from fifteen to twenty feet in diameter, is cleared and carefully swept. Since this surface must be hard, threshing can only take place after two or three days of fine weather. The mealies are threshed by the women only, plain sticks being used for the purpose. The men join in the threshing of the Kafir corn, and for this a stick with a heavy end, or a knob-kerry is used. Wheat is spread out on the threshing floor, and is trampled by oxen. In this way the straw is also broken up into chaff. Both men and women help. For the winnowing a breezy day is required. The chaff and grain is taken in the hands, or on a shovel, and cast into the air, the heavy grain falling back to the floor, while the chaff is blown away. Finally, the grains have to be carried home. This is chiefly work for men. The grain is packed into sacks or into bags, made by sewing an ox-hide or calf skin, and is taken to the village on a primitive ox-drawn sledge made from a forked tree, or from two convergent pieces of wood. Sometimes a basket work structure is built on the sledge, and serves instead of the bags. In the western lowlands a two-wheeled cart is making its appearance.

Since all agriculture is carried on by the open field system, the crops have to be protected from intruders, whether cattle or birds. Maize is protected from birds by a leafy sheath which grows over the cob, and cattle are in the charge of special herdboys. Much care and attention is devoted to the Kafir corn, from the time the grains begin to form until they are harvested. The chief marauders are birds. Frequently a light scaffolding, about eight feet high, is erected in the middle of the lands. This supports a small platform, upon which a boy or girl will be stationed, and armed with a pliable stick four to five feet long, from the end of which they can fling pellets of soft mud to some distance. The young watchers have to be in position before dawn and after sunset. For their convenience a small hut is built, usually about five feet high, and consisting of reeds and grasses.

Very often small, smoky fires are made on the windward side of a crop of Kafir corn, so that birds will be scared away by the smoke. These fires are never seen near a maize field. The final preparation of grains into meal is entirely the work of women. Though there are a few small mills in the western region, and also just over the Orange Free State border, most of the grinding is done at home by means of a large stone, on which the grain is placed, and ground by a smaller rubbing stone.

Habitations.

Like all primitive dwellings, the huts of the Basuto reflect the conditions of their environment. Though the hemispherical grass hut of the Zulu is never seen in Basutoland, there is a variety in shape, and in the materials employed. Both square and round huts occur, though the former are more rare in the mountains, except where the Cave Sandstone is exposed. The vertical walls of the huts may be made of pieces of turf, laid horizontally, or of mud, which in some cases is made into sun-dried bricks. There seems however to be an increasing tendency to utilise stone for building. The local standstones, especially the Cave Sandstone, present suitable material. Many loose blocks lie on the hillsides, and even the solid rock can be easily quarried, and, especially when fresh, easily dressed. Many huts are quite substantially built dwellings of well-trimmed blocks. Local mud serves everywhere as mortar. In the mountains huts are made of mud, or of rounded boulders of lavas or dolerite. This stone is too hard to be dressed by the natives, nor does the mountain mud set as hard as the lowland variety. Consequently, the huts in the mountains are rarely so well made as those in the lowlands, and are frequently smaller. Up at the cattle-posts a hut is constructed for the herdboys. Its walls are about three feet high, and consists often of dry stone masonary, though the interstices may be filled with mud. In diameter such a hut does not exceed seven or eight feet.

Resting on the vertical walls of a hut, as a support for a conical roof, is a framework of small poles, each of which is two to three inches in diameter. In more favoured districts these may be obtained from willows, which grow along the streams, or from the larger constituents of patches of bush; but since timber of all kinds is extremely rare, most of the poles have to be imported. They are tied in bundles of three or four, one end of a bundle being tied on each side of the pack animal, and the loose ends being allowed to trail along the ground. In this way poles are taken to the interior of Basutoland, either from the western border or from Natal, where the wattle plantations produce a plentiful supply. Owing to the difficulty of transport over long distances some of the Basuto around Mokhotlong have begun to grow sunflowers, and to use two or three of the stalks, bound together, as a substitute for some of the smaller cross-poles of the roof.

The thatch consists of a layer of tambootie grass, superimposed on a layer of reeds. Both of these materials are becoming more and more scarce, owing to the demands of an increasing population. Tambootie grass does not thrive in the mountains, and is difficult to obtain. In many cases its place is taken by wheat straw. The necessity for preserving the straw makes it impossible to trample out the grain with oxen, as is done in other districts, since this breaks up the straw into chaff. Consequently the threshing is done by the women with sticks. The small huts at the cattle posts, which may be several days' journey from the villages, are thatched with ordinary grass, though this less durable and less satisfactory.

In front of the doorway of each hut is a small space, or lelapa, enclosed by a reed fence, about six feet high. The screen protects the hut from wind, and provides a sheltered space where the cooking is done. It is a feature, which extends down towards the midlands of Zululand and Natal, where it is seen in conjunction with the hemispherical Zulu hut. On the lower terraces towards the coast, it disappears. Owing to the increasing deficiency in the reed supply of Basutoland, the screen may be omitted, or replaced by a wall of sods or of stone. Some huts supply the lack of this protection by prolonging the doorway outwards into a sort of porch. This would give a flask-shaped outline in plan. Neither lelapa nor porch occurs in the huts at the cattle posts. Here the herdboys light their fire, and do their cooking inside the hut.

According to Mrs. Martin,† the huts in the older villages were arranged in a circle. I did not see any instances of this, though such an arrangement often occurs amongst the Zulus. The usual Basuto village consists of a collection of huts, which either forms a more or less compact group, or may be scattered for perhaps half a mile along a hillside in clusters of two or three. There is no apparent general arrangement. Each of the little groups includes the main dwelling hut, with another, which is used as a store, and perhaps a third and smaller hut for the children. When a man has more than one wife, each wife has a hut of her own. Polygamy, however, is not the general rule. The census returns for 1921 show that whereas 9,813 men are polygamists, 52,210 are content with one helpmate. In the mountains, where the population is less dense, the villages are often quite small, and may consist of only two or three huts.

In each village there are several cattle kraals. Sometimes two or three small owners may build a kraal for their common use. In this case the combined herd is put in the charge of one boy, but frequent quarrels arise from the alleged carelessness of the herdboy, who is suspected of devoting most of his attention to his father's own cattle. It is considered more satisfactory, and is perhaps the general rule for each man to have his own cattle kraal.

†"Basutoland—Its Legends and Customs," 1903.

This is an enclosure of dry stone walling, square, or, more generally, circular in plan. The wall is from four to five feet high, and the diameter of the enclosure may vary from ten to fifty or sixty feet. If the kraal be rectangular, there is generally a portion walled off, and with a separate entrance, for the calves. Where the kraals are round, the calves have a smaller one, quite distinct from the main kraal. Similar pens may be built for the few pigs, and for any sheep, that may be kept about the village.

Formerly each village had its lekhotla, an enclosure where cases were tried, and where, too, men sat to talk and drink native beer. The lekhotla appears to be rather rare nowadays. In these more strenuous times, the men have less leisure. Many go to the mines, or find work outside of Basutoland, and those who stay at home may have to help on the land. In 1921, out of a total male population of 260,189, there were 37,827 away at labour centres.

The native villages always avoid the valley bottoms. They seek a position fairly high up on a hillside, or on a rock ledge. This has a threefold advantage. The huts do not occupy the fertile soil of the valleys; they receive more sunshine and avoid the cold air drainage at night; and they are so situated as to be able to overlook the lands. From his hut door a man can see that his neighbour's cattle are not straying into his crops, or that his wives are going on properly with their work in the fields.

The orientation of the huts is of some interest, and is influenced by two factors. Whenever possible, they must face the East, or North-East, in order to catch the rays of the morning sun, as early as possible; in this way, too, they will have their backs to the prevailing south-west winds. The huts should also look towards the cultivated lands. Only those huts, which are built on the south-western slope of the valley, which runs from north-west to south-east, could fulfil these two requirements. In other cases a choice must be made, and this is generally made in favour of the agricultural element, at the expense of the pastoral, so that the huts will face downhill towards the crops, even though this may involve a south-westerly orientation. In East Griqualand, near the foot of the Drakensberg, where the natives are less agricultural, I noticed several villages in which the huts were arranged in a single straight line, and were facing up hill, but towards the North-East.

In East Basutoland, near Bushman's Nek, there is a special group of villages. The district near the edge of the Drakensberg escarpment is probably the coldest and bleakest in the country. In places the Cave Sandstone outcrops, and forms its usual caves and rock shelters. These have been utilised for protection, and the huts have been built under the overhanging rocks. The village of Sehlabathebe is situated entirely in a large, open cave, which has sufficient space to accommodate several hundred head of cattle in addition to the huts. Outlook over the lands is not so important here, because only Spring wheat is sown, and the cattle are mostly away in the Summer pastures during its period of growth.

Whenever possible, villages are built near a spring. Running water is regarded with suspicion. The streams, especially in the more low-lying areas, are discoloured by mud during a great part of the year; and the water might not be very clean if there were other villages upstream. It is becoming more difficult to find suitable springs, since the number of villages is rapidly increasing. Many of the springs are liable to fail during the dry season, and the water has to be carried, perhaps for two or three miles in pitchers on the heads of women. Moreover, there appears to be a general lowering of the water table, which may possibly be connected with the growth of dongas and the cutting of bush. Many well-known springs are failing. I was told by the ferryman at Seaka's Drift, on the Orange River, that seventeen springs, which he remembers in the locality, have disappeared during the last thirty years.

It will be seen from the following figures that Basutoland is an important stock raising country. The numbers are those supplied by the natives for the 1921 census. It is thought by several people who are competent to judge, that an increase on all returns of twenty per cent. would probably give more accurate figures:—

Cattle ...	576,125	Sheep ...	1,857,811
Horses ...	153,785	Goats ...	894,993

Total population, 543,078.

Pastoralism.

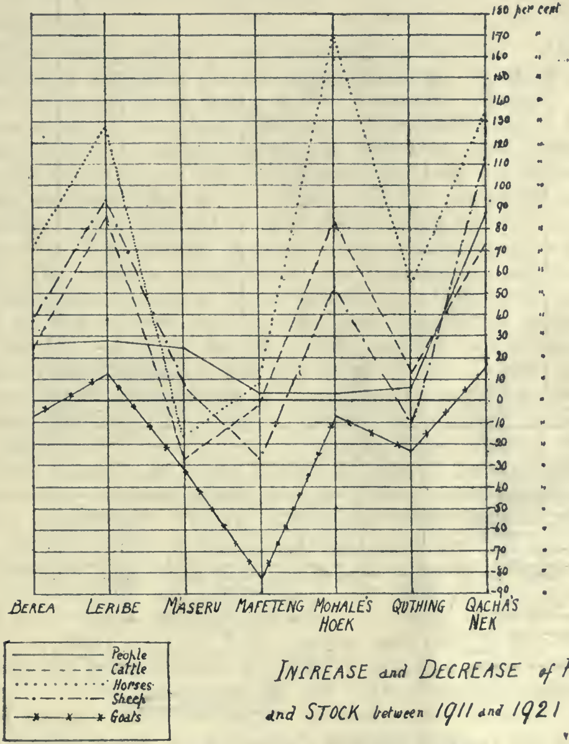
Stock is by no means evenly distributed throughout the country. The mountainous districts are less agricultural than the lowland districts, and consequently can provide pasture for greater numbers of animals. The disparity between the various districts is seen most clearly in regard to horses, goats, and sheep, which are relatively most important in Qacha's Nek and its sub-district of Mokhtolong. The high proportion of horses may in some degree be connected with the transport difficulties incidental to the more remote mountain areas.

Animals are the individual property of their owners, whose marks they bear. The ear is cut by means of a knife, each owner having his particular shape of mark. The sheep may also be marked by a patch of paint on the body. Occasionally the ear-clipping is replaced by a slit in the nostril. It is more difficult for sheep-stealers to modify this.

The sizes of the flocks vary greatly. A poor man may have twenty or thirty sheep, whereas an average owner in good circumstances will probably possess from three hundred to five hundred, and the flock of the wealthy man may include as many as three thousand or more. When a man has no stock of his own, he can generally find a relative or a large stock owner who will lend him a number of animals, of which he will have the entire use. They will supply him with milk and will plough his fields. They remain, with their progeny, the property of the lender. It frequently happens that trouble arises over their calves, especially when these are born in the mountain pastures, where it is difficult for the original owner to keep a check. The calves may be sold to other men, whose mark they will bear, and they can be accounted for to their proper owner as having died. Although I questioned both chiefs and commoners, I could not discover that such a loan of stock involved the borrower in any obligation towards the lender.

In Autumn most of the cattle come down from the mountains. The date of this movement is fixed by that of the harvests. When the heads of the maize and Kafir corn have been gathered, the standing stalks are used as pasture for the cattle, and, like all pasture in the country, it will be common grazing. As soon as the harvest has been stored, that is towards the end of May or early in June, the chief declares the lands open. The cattle are then brought down and turned into the standing stalks. It will now be understood that the practice of sowing wheat in Autumn does not appeal to the cattle owner. Not only do these wheat lands provide no stalks for grazing, but, since the young shoots are above ground in the Winter months, the cattle have to be kept off these lands. For these reasons some of the northern chiefs do not protect them against trespass. In parts of the mountains, where the only serious crop is wheat, which is reaped in March, the downward migration in Autumn depends upon the weather conditions and on the amount of pasture available about the villages. In addition to the cattle that have come down from mountain cattle posts, there are some that have been kept about the villages throughout the Summer to supply the people with milk.

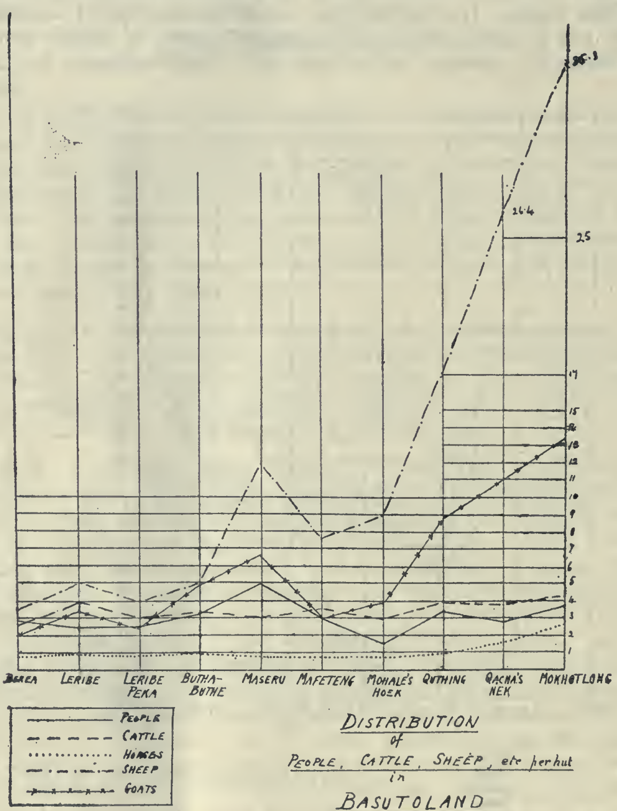
At the village pastures the cattle are carefully tended by herdboys. About dawn they are driven out to pasture among the mealie stalks as long as these last. This is the only way in which the lands are manured. In the evening, just as the shadows of the neighbouring hill are falling over the village, the cattle return. Then they are milked, and penned in the kraals for the night. It is surprising to see the number of animals that can be packed into a kraal, the outside measurements of which were 12 x 17 yards. There are several advantages and disadvantages in the system.



INCREASE and DECREASE of PEOPLE and STOCK between 1911 and 1921 in the DISTRICTS of BASUTOLAND.

The cattle are prevented from straying at night amongst any growing crops, and thereby creating trouble for their owner, who is charged a shilling for each animal that trespasses by day, and one shilling and sixpence for each offence committed at night. Since most of the country is devoid of timber, the manure from the kraal constitutes the chief fuel, or lisu (pronounced "deesu"). It is dug out, made into flat slabs, and dried in the sun, and is then arranged in a neat little stack close to the hut door, just as one sees peat in Britain. The scarcity of fuel has therefore retarded the improvement of agricultural methods by the use of a fertiliser.

The cattle moving between the villages and the lands generally walk more or less in Indian file, and many rough paths are thus formed, radiating from the villages out into the lands. During heavy showers of rain in summer, the rapid run-off concentrates in these paths, and at the rate of erosion, owing to the gradient and the nature of the soil, is very high. Many dongas are being formed in this way, extending, with nearly vertical sides, to a depth of thirty feet or more. They are already a serious menace, since much good soil is lost and the water-table lowered, so that the neighbouring lands suffer more readily from drought.



DISTRIBUTION
of
PEOPLE, CATTLE, SHEEP, etc per hut
in
BASUTOLAND

A month or six weeks after the cattle have come down from the mountains the maize stalks will be exhausted. During the remainder of their stay at the villages the cattle are not likely to be overfed. No winter feed is grown, except an occasional small patch of oats, which are reserved for the riding horses or are sold to white people. There still remains some grass pasture. In November, when the Spring rains have made the new grass to grow, the chief, or headman, marks off certain areas by means of small branches stuck at intervals in the ground, or small heaps of stones. This spare-veld, or winter-veld, is reserved for winter grazing, and any owners who allow their stock to stray there during Summer are liable to the usual fines. The winter veld generally consists of pasture around the crops, so that both can be guarded together. Travellers have the right, when off-saddling, to allow their horses to graze in winter veld, and the same privilege is extended to any migrating stock. Pasture, in which the tall, tambootie grass grows, is forbidden to all, because this is essential for thatching. At the beginning of winter the boundary marks are removed, and the spare veld is declared open. The increasing population, with its need for more agricultural land, is reducing the amount of winter-veld, which varies considerably in different localities. The amount of this reserved grazing is an important factor in deciding the size of the transhumant herds, and the date of their migration. As winter wears on grass becomes scarcer, and the stock steadily lose condition, until by spring they are very low and thin. The pasture problem is ever present. Sometimes, during the winter, the cattle may be taken to graze four or five miles from their kraals. From the villages about Ntauti's, they travel each day to the lower ground near the Semena River. On the lowlands, however, they generally have to shift as best they can.

Spring Migrations.

With the spring come great movements of cattle. About August the early rains have revivified the mountain pastures, word of which has been sent down from the cattle posts or the mountain villages. Moreover, the home lands must be ploughed, and sown with Kafir corn. A few cattle are kept at the villages to supply the people with milk, and some oxen are kept back for the ploughing. The remainder are sent up to the cattle posts. I met with one exception to this rule, and there may be others. On the Berea Plateau, near Senekal's, is a considerable herd, that never goes to the mountains. The plateau consists of cave sandstone, and surface water is absent. The villages collect about its margins, or just below its escarpment. Consequently only a comparatively small proportion of its surface has been broken up for agriculture, and pasture is unusually plentiful. Here the Mosuto can enjoy his ideal of having his cattle always near him.

The migrating herds are put in charge of boys. Two or three of these may be selected to take charge of a combined herd, or each man may send up his own herdboy. The boys must be old enough to know the cattle marks. They vary from ten or eleven to about twenty years old, after which they frequently go away to the mines. A new practice is springing up of appointing a poor adult, who is given a definite wage, but this is still a rare occurrence. When a wealthy owner has to divide his cattle amongst several cattle posts, the usual herdboys will be sent in charge of each post, but an adult may be put in a small village in a mountain valley, from which he will periodically visit each post in turn, and exercise a general supervision over the group. In time other families may come and build their huts near his own, and he will then evolve into a headman, and in time may even become a chief. I met one chief who had grown up in this way. There appears to be but little ceremony connected with the spring migration. The herdboys, however, are prepared by the witch-doctor by having a cut made at each joint and above the right eye. This is a protection against lightning.

The distances between the villages and the summer cattle posts vary greatly. Cattle from about Maseru, and some belonging to the Paramount Chief at Morija go to the mountains to the east of the Sinqunyane River. From about Senekal's, on the Berea Plateau, they travel eastwards to the country about Thaba Putsua. These movements may involve three or four days' travelling. The speed depends on the state of the pasture. Where this is good the cattle loiter and graze as they go; but when the grass is poor they are hurried through much more rapidly. The central highlands about Lehaha la Sekonyani also receive stock from the direction of the Orange River. From the lower part of the Orange River, about Fort Hartley, the animals are driven southwards up to the border fence, a journey that may take two or three days. Most of the herds from Simpi's village are taken up to the head of the Quthing River, near Ongeluk's Nek, where there is also the stock from Makwai's and Machesetsa's, two villages lower down the river. The latter cattle are within an easy day's march of their home villages. From Sehlabathebe the herds move up towards Bushman's Nek, about two hours' ride away. These distances are of greater importance when considering the shearing customs and the movements of sheep and goats.

It must not be thought that after the spring migrations all stock movement ceases until the general downward journey in autumn. Practically throughout the summer there is exchange going on between the villages and the cattle posts. Some oxen were kept at the villages to plough the Kafir corn lands in August and September. These animals may then move up to the summer pastures, or they may be kept still longer for the maize ploughing in October and November. For this they may be reinforced or relieved by fresh oxen from the mountains. In November and December the early wheat has to be threshed, and oxen are again needed. About November, too, a number of milch cows that have recovered in the mountain pastures from the winter scarcity, are sent down to increase the village milk supply. Formerly these used to be ready by September or October, but the quality of much of the upland pastures, like all others, is steadily deteriorating as a result of overstocking, especially with sheep. In some areas, where the mountain grazing grounds still retain their old richness, it is necessary to send down some of the younger animals, which are liable to over-eat themselves, and to suffer in consequence from quarter evil.

Towards the latter part of December, and during January, there is, therefore, a large secondary migration towards the mountains. In the third week of January a herd of four hundred head was sent up from Ntauti's village. Many of the cattle from about Sebalabala, in the Berea District, do not go to the summer cattle posts until January. In fact, the January migration seems to be the principal upward movement of stock from this area. This may be due to the richly agricultural nature of the district and to the greater amount of work required from the somewhat less numerous herds.

The Summer Pastures.

The true cattle posts are now confined to the centre of the country and to the high land near the edge of the Drakensberg escarpment. The post consists solely of the mathebe, or hut, which has already been described. Sometimes a small cattle kraal is also present. This is not always so; it seems to depend on whether the sheep are sheared here or at the villages. The hut is built as a rule near a hill top or general vantage point, from which the herders can look after their charges. When the number of stock is large, herdboys may be detailed to look after the cattle, sheep, or goats respectively, but it is just as usual for two boys, who live together in the hut, to have joint charge of both flocks and herds.

The following description is based upon my observations at a cattle post near Lehaha la Sekonyani, where I stayed for some time. It agrees in most details with other posts which I have visited. The hut is built on a hill top, 9,000 feet high, and faces towards the North-east, with a wonderful view of perhaps forty miles over the dissected plateau. At these altitudes the climate is always invigorating, and the night temperature falls, even at Midsummer, sufficiently to make the herdboys require to the full the protection of the sole garment they possess, which consists of a sheep or goat skin, worn as a cloak, with the wool or hair inside. In the early mornings the grass is heavily covered with dew, and there is a clear, biting freshness in the air. Just before dawn everything is quite clear, but with the rising of the sun, a sea of mist begins to collect in the Orange River Valley, and its upper surface reflects the growing light. Gradually the mist rises until only the tops of the higher mountains are left unsubmerged, smoky blue, rising out of a sea of shining foam.

The stock at this post belong to a man who lives in a small village near Ntauti's. In addition to twenty cattle, with several calves, there were about three hundred sheep with their lambs. Both calves and lambs are born at the cattle post. Apparently no special arrangement is made for this, which takes place out on the hill side. In charge of these animals were two boys, about eleven and fourteen years old. They had with them two large dogs of unknown ancestry, which were not used in herding the stock, but merely as watch dogs to give warning of any night prowlers, who might try to steal some of the animals. There were also some fowls about the hut, so that the boys could eke out their food supply. The old prejudice against eggs is gradually dying away.

During the day the sheep and cattle wander off about the hillsides, and are little troubled by the herdboys, who may occasionally walk around to see that everything is all right, but who can generally see most of their charges from the hut. It is quite common to see cattle, sheep and goats intermingled and grazing together, but when the grazing lands include a rich valley bottom, the sheep and goats may be restricted to the upper slopes, the richer pasture being reserved for the cattle. At dusk the flocks and herds return to the hut. On a bare rock surface a few yards away salt has been sprinkled, and is licked up by the animals. Cattle and sheep each go to their own surface. There is no confusion, and very little herding has to be done. The animals know their own little area, and go to it. The flock of sheep, which had divided during the day, came home in three separate columns from three different directions. Yet the concentration was well timed, the three columns arriving almost simultaneously. The flock lies down for the night on the flat hill top, and is driven afield about sunrise. There is very little fear of wild animals. Jackals and wild cats have been hunted so ruthlessly that they have become very scarce. Very different is the case in parts of Natal. In Basutoland, wild animals of all kind have become very scarce. Buck are only seldom seen, and the only shooting one can depend on is quail, partridge, with duck about the rivers, and occasionally some wild turkey.

A small kraal forms part of the cattle post, but it is only used for shearing the sheep, and for an occasional inspection. The sheep may be driven into the kraal on their return in the evening, inspected, counted, and then turned out to go to their sleeping place for the night. If a flock of goats is attached to the post, the kids, when quite young, may be put into the kraal during the day, and their mothers brought to them in the evening. This precaution is said to be necessary, because the Angora goat is a bad mother.

Milk at this cattle post was scarce, since all the milch cows had their calves with them. A neighbouring post, about half a mile away, was, however, able to supply some. The herdboys live chiefly on mealie meal porridge and milk. They bring up some meat with them in the spring, and when it is exhausted, one of them will ride down to the village for a further supply, returning immediately. As a rule there is plenty of milk available. Goats' milk is only used when the supply from the cows is insufficient. Occasionally an animal may die. Then the herdboys have a great feed of much-coveted meat. In winter a stock owner may allow his herdboys to kill one or two of the oldest or poorest sheep a month. As there is practically no supervision of the distant cattle posts, animals may die more frequently than this. The post-mortem examination is conducted by hungry herdboys, whose report as to the true cause of death may be somewhat biassed. Apart from porridge, milk, and occasional meat, their diet is varied by anything they can catch, such as small birds and field mice, toasted at the end of a stick.

The abundant leisure which this life affords to the boys is occupied in several ways. Many of them are quite good modellers in clay, and make little images of cattle or horses. This appears to be a conventionalised art. Their clay cows have always the big hump of the old Africander ox, which is by no means conspicuous in the present herds. They are obviously copying other models, and are not directly observing nature. Frequently a boy can model either a horse or a cow, but not both. What seems to be a new industry is growing up. The boys collect wool or mohair, and convert it into thread by rubbing it between the hands. Then with one or two small sticks, the thread is crocheted or knitted into caps and gaiters. Sometimes one sees entire blankets made of this work, and even bridles and horse girths.

The mountain pastures are administered by the chiefs. Each man has the right of sending stock to the mountains. He applies, either directly or through his headman, to the chief, stating the number of stock for which he wants pasture, and is then allotted a site on which to build his mathebe. He is then free to send up his flocks and herds whenever he likes, and to keep them there as long as he likes. As far as I could discover, there are no definite boundaries between the grazing grounds of one cattle post and those belonging to another. Lekholoani explained to me that a new arrival in his village would apply to him for a cattle post. He would then be taken to Makhaola, the great chief of the district, who would allot him the required site.

Autumn Migrations.

It has already been said that most of the cattle return in autumn to the village pastures as soon as the lands have been declared open. In the case of cattle belonging to mountain villages, the date of their downward migration depends on the weather, since there are few or no maize stalks awaiting them. By the end of May or the early part of June severe cold may have set in among the mountains, and it is necessary to bring the cattle down to lower levels. Where only a few cattle are owned by a village, which, owing to its small numbers has broken up but little ground for agriculture, pasture may be more plentiful, and it is possible for the cattle to move homewards much earlier. The owner of the cattle at the post near Lehaha la Sekonyani told me that his cattle return to the village in March, and that if left to themselves they would descend from the high levels at that season of their own free will.

Since the village pastures are becoming more and more inadequate to the increasing stock, instances are growing more frequent of some cattle being left in the mountains throughout the winter. In this case selection has to be made. The milch cows and the poorer stock are taken down, while the fatter and stronger oxen are left to face the winter in the mountains with the sheep and goats. The only downward journey made by some of the oxen from about Bushman's Nek is in Spring, when they are taken to plough the wheat lands about Sehlabathebe. As soon as this is completed they return to the cattle posts.

It will be seen from the graph, that sheep and goats become most important in the mountain districts of Quthing, Qacha's Nek, and Mokhotlong. Their comparative importance in Maseru is due to the fact that this district extends far into the interior of the country, and includes a large extent of mountain pasture.

The general rule is that sheep and goats remain at the cattle posts throughout the year. There are, however, some exceptions, which are mainly connected with the lambing and shearing customs, and will be dealt with in due course. One or two minor points may be mentioned here. Rams are kept at the villages, and are only taken up to the flocks during the mating season. While at the villages they are grouped, and put in charge of one man, whose reward is their fleeces. When a Mosuto possesses only a small flock of sheep or goats, they may be brought down from the mountains for winter, and may even pass the summer about the village. This is impossible for the larger flocks, which would soon destroy the pasture. Goats suffer more than sheep from cold, and in a few cases they may be moved to somewhat lower pastures for the winter, as is done about Senekal's on the Berea Plateau. Those from near Ongeluk's Nek are brought down and pastured on the hills near their home villages, Makwai's and Machesetsa's. These exceptions, however, are not sufficient to modify seriously the general rule.

In the autumn most of the cattle have left the mountain pastures, together with the small boys in charge of them. The sheep, goats, and remaining cattle are now left in charge of a single headboy, who may be from eighteen to twenty years of age. He leads this life until he is about twenty, when he probably goes away to the mines or seeks employment outside of Basutoland. Otherwise he may continue his herding life until he marries.

Even in winter the sheep are rarely driven into the kraal. In the event of a snowstorm they are collected on the brow of a wind-swept hill, which may often be their normal sleeping place. Here the wind prevents the accumulation of much snow. Cattle are trusted to shift for themselves.

Lambs and kids are born in early Spring, usually in the mountain pastures. In some cases the flocks may be driven down to the villages, where they will remain during lambing, and until the spring shearing. The controlling factors are the amount of pasture available about the villages, and the size of the flocks.

The sheep and goats from about Thamatuwe are sent down to Moshebi's village, and some of those from about Ongeluk's Nek descend to the villages lower down the Quthing River. In both of these instances the mountain pastures are unusually cold and bleak, being close to the edge of the escarpment. Moreover, the villages are small, and have very little agricultural land, most of which is devoted to wheat, sown in Spring.

Shearing.

Shearing practices shew little uniformity. Goats are only sheared once a year, in spring, but the sheep may yield two clips. Some of the large sheep-owners may shear once a year for the long fleece, but the more usual practice is to shear twice a year. Although the short fibre of these half-yearly fleeces diminishes their value, the two clippings help to check sheep scab, which is very prevalent.

The first sheep shearing takes place after the lambing, sometime about September. Owing to the colder climate near the Drakensberg escarpment, it is later along the eastern border. Near Sehlabathebe it lasts from October to December. Goats being more sensitive than sheep to cold weather, are sheared after the sheep have all been clipped. This causes the mohair shearing to fall about a month later, generally in October, by which time the weather is milder. Sheep are again sheared before Winter. This occurs about March, but may drag on into May. Much loss of life may be caused by cold rains occurring early in Spring after the lambing and shearing, or late in Autumn after the second clip. When only one fleece a year is taken, shearing takes place in January.

There are three places where shearing may be done; firstly, at a trading station; secondly, at a village; and thirdly, at a cattle post.

(1). Flocks are driven sometimes to a trading station and sheared there. This occurs at Mount Morosi, but is by far the least common. The pasture about the trading station gets destroyed, and the custom tends to limit the owner's freedom of sale.

(2). The more favourably situated villages, like Makwai's or Moshebi's, may bring down their flocks from the cattle posts, but they can only do so if there is plenty of pasture about the village. Where this is possible, the serious trouble of transporting the wool is much diminished, but even villages in the heart of the mountains, like that of Lekholoani, have to do their shearing at the cattle posts though sometimes a small flock, consisting of a score or so of sheep, may be brought to the village for shearing. It seems that formerly shearing at the villages was more common, but it is being pressed away into the mountains.

(3). Ninety per cent. of the sheep and goats are probably sheared at the cattle posts. The transport of the wool and mohair becomes a serious problem, involving, as it often does, a four or five days' journey. Further consideration will be given to this question. When a flock owner decides on his shearing, he calls together his friends, and they all ride to the cattle post, where a sheep is killed to feast the party. No other payment is expected for services rendered on these occasions. Should the shearing take place near a village, leting is provided, and adds considerably to the general cheerfulness of the shearers, if not of the sheep. At the cattle post near Lehaha la Sekonyani, the flock of three hundred sheep is sheared by the owner, assisted by herdboys from the neighbouring posts. At his last shearing, which took three days, eight herdboys helped, and were feasted with the usual meat.

Horses.

The horse is one of the Mosuto's most prized possessions. It is extremely uncommon to see a man on foot if he is travelling any considerable distance. Even the boys ride everywhere. They take a horse, if possible, but, failing this, an ox makes a good substitute, the ordinary bridle being replaced by a plaited string passed through a hole in the animal's nostril. Women ride astride.

If a man owns one or two horses they are kept near the village for riding purposes, and in winter may be given a little forage. Many of the horses, especially the mares and their colts, are kept at the cattle posts. Here they are practically left to run wild, and are rounded up perhaps every three or four months. As they seem to have a sense of locality, they are fairly certain to be found, when wanted, within a radius of ten miles. The old-fashioned Basuto pony, with his well-earned reputation for strength and endurance, is becoming very rare. Much of the present stock consists of thin, weedy animals. This seems to be due, in part at least, to the fact that they are rarely sufficiently fed, and are probably made to do some work when they are a year or two old. Although the Government is introducing good blood into the country, the colts never have a fair chance to grow.

Trade and Transport.

Quite a considerable trade is carried on in Basutoland. The Basuto sell most of their wheat and wool at the trading stations, and either buy back or receive in exchange, maize, Kafir corn, blankets, clothing, saddlery, ploughs, tea, sugar, salt, etc. In the areas where Kafir corn and maize can be grown, one might expect the natives to be less dependent for their food stuffs on the traders, but apart from a small amount of grain, reserved for their immediate use, most of their crops are sold, and will be bought back a few months later at a considerably higher price.

Practically all native transport is done by pack animals. Mules, though very efficient, are rarely used. They make little appeal to the Basuto, partly because of their comparatively high cost, but chiefly because they do not breed and increase the number of stock. Donkeys are sometimes seen, but until they have become acclimatized, many die of cold in the winter. The commonest transport animals are oxen and horses.

The normal load for oxen, horses, and mules is two bags of grain, that is 400 lbs., between three animals. Each animal's load, 133 lbs., is placed in a sack and slung over the back, being tied in position by a ream, or long thong of raw hide, which seems to be drawn cruelly tight. In the same way a pack animal carries from 120 to 130 pounds of wool, which is sometimes brought down from the mountains to the trading stations by strings of horses ,tied head to tail. At the end of three or four days' journey the animals are often in a terrible condition from galls and sores. A native seems incapable of realising an animal's sufferings.

Trading stations are dotted freely over the western lowlands. They are frequently an hour's ride apart, that is about five or six miles, but here and there, near important tracks, there may be groups of two or three. A line of trading stations extends up the Orange River as far as wagon transport can reach. The last big store is at Mount Morosi, which has two outlying posts, which can only be reached by pack animals and human transport. Further up the Orange River are a few more stores, fed in the same way from Qacha's Nek. Sehonghong and Sehlabathebe are supplied from Ramatsediso's, which is accessible to wagon transport; the stores at Mokhotlong are in touch with Natal by one of the Drakensberg passes. Near the centre of the country is Thaba Tseka store, about half a mile from Ntauti's village. The trading stations are more or less confined to the marginal areas of Basutoland. Those in the interior, that is, practically, those above the cave sandstone, cannot be reached by wheeled vehicles. Their transport is done mainly by pack animals, but anything liable to breakage or spilling, such as crockery or paraffin, is generally carried by women, who take on their heads a load of forty or fifty pounds. For carrying such a load twenty or thirty miles they receive half-a-crown or three shillings.

It might seem, at first sight, as though the innermost store would capture all the mountain trade, since natives, coming down to buy grain, would deal at the first store they reached. This is only partly true. As long as the stores are selling back to the natives their own grown grain the innermost station does have an advantage, but when maize has to be imported transport charges become an important item. For instance, the charge for each load taken by a pack animal from the lowlands up to Ntauti's is seven shillings, which adds half a guinea to the cost of a bag of grain that could be bought in the lowlands for ten shillings. Not only do the lower and marginal stores have shorter distances to contend with in their transport, but they have the additional advantage of being able to use wagons. The usual span of sixteen oxen harnessed to a wagon can take as an average load, thirty bags of grain, or six thousand pounds. As pack animals they would have been able to carry somewhat over two thousand pounds ($200 \times 2 \times 16 \div 3$). Obviously a store which is accessible to wagon transport is able to sell more cheaply and to pay a higher price for products than one whch is dependent on pack animals. Many natives have their own transport animals, and, since time is of very little value, they will sometimes pass a whole succession of stores until they reach those nearer the source of supply, where the prices are more favourable. I met several large parties returning to Hlakanelo's with grain, which they had bought in Basutoland, that is in the western lowlands, four or five days' journey away. The wool from the centre of the country may be taken down either to Natal, East Griqualand, or to the Orange Free State border. At the same time, it must be stated that many of the inward trading stations buy up large quantities of wool. Those natives with insufficient transport will sell to the nearest store. It will be noted that such districts as Mokhotlong, which appear to specialise in sheep and goats, have not a corresponding predominance in transport animals. It might be interesting to speculate as to how the wool trade of the mountain stores would be affected if the work of transportation could be relegated to the women.

Economic and Social Changes.

Perhaps the most interesting feature of Basutoland is to be found in a study of the change which is rapidly taking place. Certainly no description of the country and people could afford to ignore this. The following account will, however, be as brief as possible.

As a result of the increasing population, there is an increasing difficulty, especially in the lowlands, in providing each man with agricultural land. Twenty years ago the country about Masiti was practically all pasture, where now is an expanse of cultivated lands. I was told by several informants that formerly a man could have as much agricultural land as he could cultivate. This is corroborated by Mrs. Martin.[1] It is not true to-day. Nowadays a man's holding is restricted to three lands, each about 100 yards x 150 yeards. In some cases he does not receive this much. The increasing cultivation is proportionately diminishing the pasture available about the villages. This is particularly so when autumn wheat is sown. Yet the number of cattle is increasing. Consequently their stay in the mountain pastures is becoming more and more extended. Some, it has been seen, only come down to the villages to plough the lands in spring.

The accompanying graph will shew that the lowland districts are practically saturated under present conditions with population and stock. It would be all the more clearly seen did not the western districts all include varying amounts of mountain pasture lands. It must also be remembered that agricultural progress has been retarded by the necessity of burning the kraal manure as fuel. The increase of the last ten years has taken place largely in the mountain areas. Unfortunately no separate returns were made in 1911 for the sub-district of Mokhotlong. Though Qacha's Nek as a whole has increased both in men and animals, most of the increase is due to the growth of Mokhotlong. The contrast with the wheat growing area of Mafeteng is very marked, while the more mountainous districts of Leribe and Mohale's Hoek have had much the same experience as Qacha's Nek.

There can be little doubt that the country is badly overstocked. The village pastures are becoming rapidly exhausted. Much the same tale can be told of large areas in the mountains. Most of the damage is apparently done by the sheep, which graze much more closely than cattle, and even dig up the roots of grasses with their feet. Large tracts, where a few years ago was luxuriant pasture, are now covered by low bushes and weeds, which no stock will eat. In other areas, where the grass has been removed from the steep hillsides, the soil has quickly followed. Weed covered slopes and bare rock are becoming far too common in areas where the present inhabitants remember good pasture. During the last two years (1920-22)

[1] "Basutoland—Its Legends and Customs." 1903.

the price of wool has fallen very low, and the desire for large flocks has weakened. Moreover, the maize crops have partially failed. The Basuto have therefore been forced to buy much imported grain, and a considerable proportion of this has been paid for with sheep. In January, one dealer alone from East Griqualand collected from the area about the Quthing River, two thousand, seven hundred head of sheep in payment for maize. A few bad grain seasons may, therefore, be a blessing in disguise, if they force the native to sell off some of his sheep, and so give the pastures some chance of recovery.

The movement of population into the mountains has led to a substitution of wheat for maize and Kafir corn as a crop, and, in part at least, as a food. Crops of wheat are now to be seen high up on a mountain side, perhaps 1,500 feet above the village. To plough these lands the plough is taken to pieces and carried up on the backs of oxen, or it may be mounted on the native sledge and dragged up a rough, stony track. The development of the mountain wheat lands is pushing the true cattle posts further and further into the remoter parts of the country. At no very distant period the mountains will themselves be saturated with population, and since the summer pastures will therefore be turned to other uses, seasonal migration of stock will be greatly restricted. This may force the Basuto to grow winter feed, and to fertilise their lands in order to increase the yield of crops.

Another result of the pressure of population, and of the importance of agriculture in the life of the people, is a marked growth of individualism, which is beginning to make itself felt in social and political matters, and is modifying the general attitude towards property. There is no private property in land, which cannot be sold. Possession of land lasts as long as work is being put into it, that is from the spring ploughing until the harvest has been gathered. Then the standing stalks become common pasture. The sowing of autumn wheat becomes a complicating factor, which is not always in favour with the more conservative chiefs. There is also a tendency to regard the mealie stalks as private property, and they are sometimes sold to the trading stations.

Formerly, every householder could gather what reeds were necessary for thatching his hut, and making the lelapa. Owing to the increasing demand reeds are becoming more difficult to obtain, and some of the chiefs are exacting payment for them. The people reply by claiming their huts as private property, especially as the woodwork was, in all probability, also purchased. The question was hotly debated in the Pitso, or national council, the people claiming as private property that which they had purchased, while the chiefs replied by pointing out that the hut was inseparable from the site on which it stood, and which belonged to the chiefs as trustees of the nation. It was finally decided that a hut could not be sold, but that any material which had been purchased could be taken away. Formerly, when all building material was supplied free, a hut relapsed to the chief, if its occupant went to live elsewhere. Some white traders have been obliged to pay the local chief, or headman, for building stone.

Until recent years, when a man returned home from the mines, his wages were handed over to his parents. Nowadays, he often contents himself by presenting them with one or two blankets. The necessity of a village's surplus population moving away to seek land for itself has caused each village to be a more or less fortuitous gathering of people, not necessarily related to each other. A man may live in one village, while his son, or father, may have settled in another, perhaps on the other side of the country. The social bond of a common blood seems to have largely broken up. A chief, or a headman, is no longer akin to all those who live about him. This appears to have modified the structure of the village, since the old circular type has been replaced by a loose aggregate of huts.

Many of the Basutos have been converted to Christianity, but the influence of Europeans has spread much further than actual conversion. Though the old belief in witchcraft still retains its hold, a criticism of tribal customs and duties is growing. It is often accentuated by increased wealth. During the war the sheep owners accumulated considerable amounts of money, and have been showing an increasingly independent spirit. Most of the criticism is directed against the chiefs who sometimes seem inclined to forget their original status and to develop into feudal proprietors.

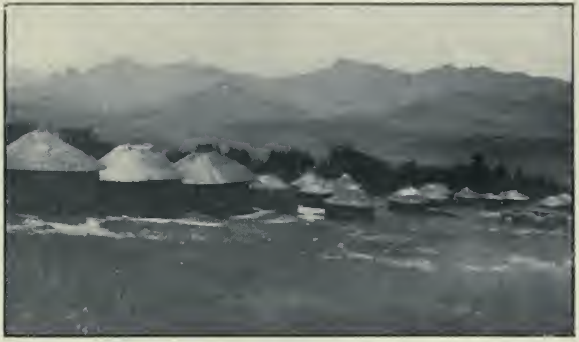
Much resentment is felt at the way in which justice is administrated. When the chief, as judge, also receives the whole or part of the fines he inflicts, the human factor may become too great for impartial justice. Moreover, there seems to be a great deal of delay, inevitable or otherwise, in hearing cases. A plaintiff may be kept waiting at his chief's village until his food supply is exhausted, and when he has returned home for more, his case may be called. It can then be dismissed, and the plaintiff may be liable to be fined for contempt of court.

Many natives realise the need for improving their methods, and increasing the yield of the soil. In consequence there seems to be a growing desire for private property in land. Many are willing to plant trees to check the growth of dongas; but if a man appears too prosperous, a case may be brought against him, and he may be subjected to a heavy fine. Again, should his lands yield better crops than those of his neighbours, a chief may take the lands for his own use and allot the man other lands elsewhere. Until some greater security is given to the commonalty it seems unlikely that any great progress in method will be made. Nevertheless, popular opinion is beginning to exert an increasing pressure, and the Basuto seems to be inevitably destined to pass in the next few years through changes of much interest to the sociologist.

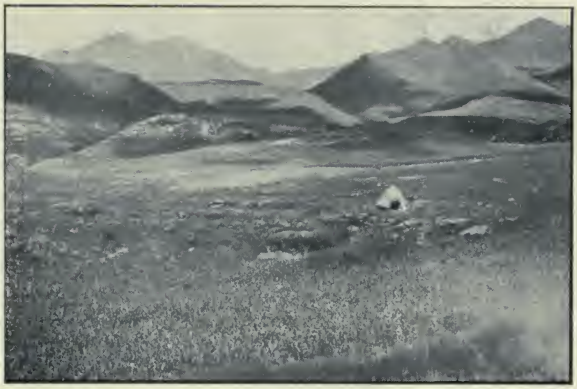
Twenty years ago, according to Mrs. Martin, the dress of the Basuto consisted of a lamb or sheep skin about the loins, and a kaross either of ox-hide or made of the skin of small deer, rock rabbit or silver jackal, thrown over the shoulders. If the people depended nowadays on the last three animals the majority would go naked. With the exception of the goat skin, or sheep skin, worn by the small herdboys, some form of European clothes is now universal, and invariably includes at least one brightly coloured blanket, used as a cloak. Owing to the high war-time price of blankets there has been a tendency, though perhaps not very serious, to substitute for them the old ox-hide kaross, or a blanket made by knitting the wool of their own sheep.

In conclusion, I should like to record my indebtedness and my thanks to all those friends in Basutoland, who so willingly gave me the advantage of their experience, and whose kindly hospitality made my journey much easier than it would otherwise have been.

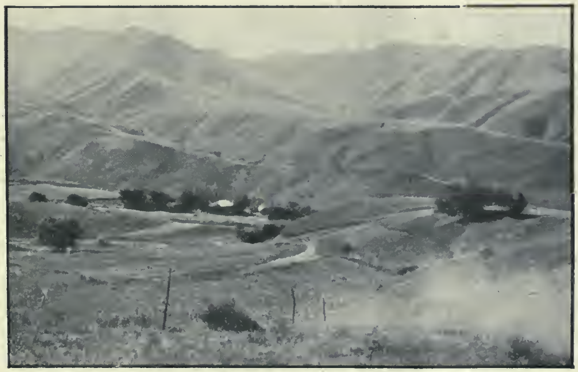
All the illustrations accompanying this article, and appearing elsewhere in the "Geographical Teacher," are printed from blocks made by Messrs. Bale and Danielsson, Great Titchfield Street, W.



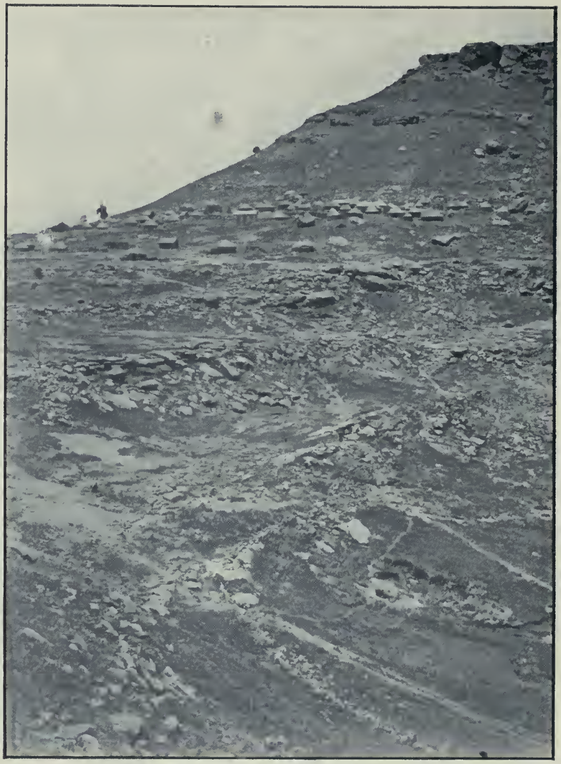
Native Village, huts face N.E.
Three Sisters' Pass, Drakensberg.



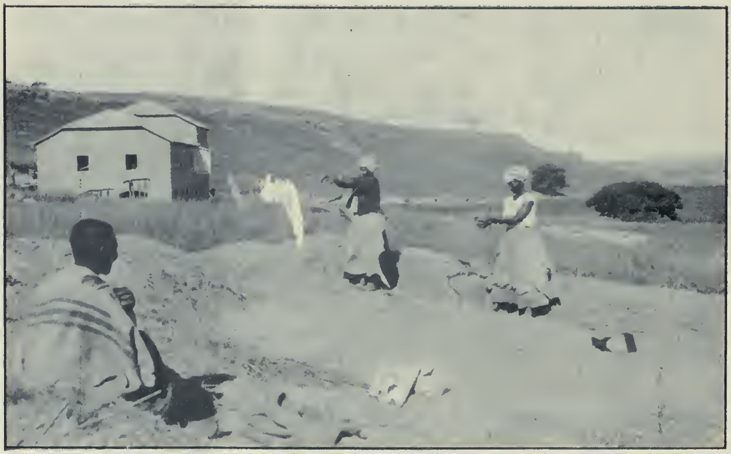
Kaffir corn foreground, Cave Sandstone middle ground, near Mosalimani.



Grassy slopes on volcanic beds, Qucha's Nek.

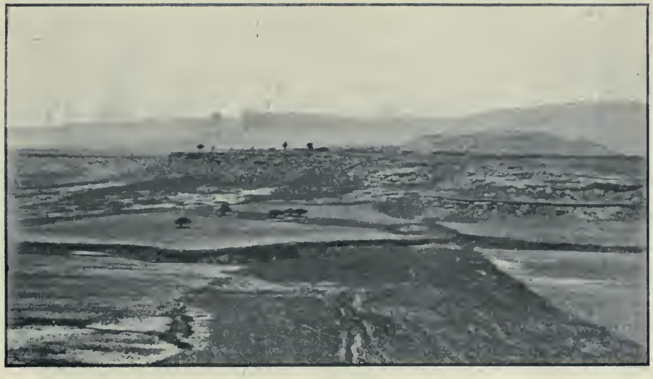


Leklatsa's village on sandstone ledge:
Cattle tracks.

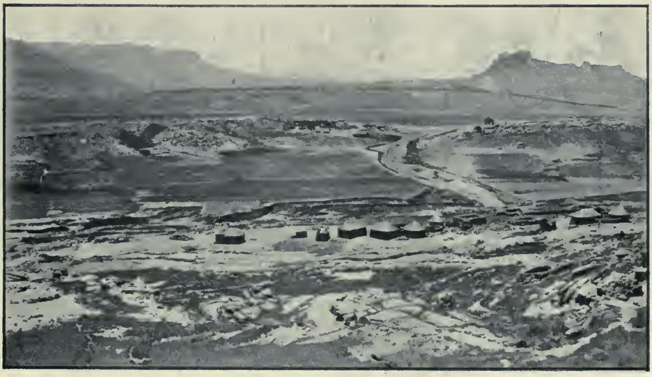


Winnowing Wheat: Mission Station.

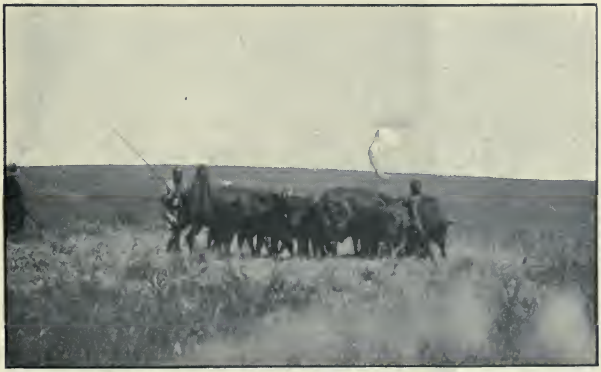
AN ETHNO-GEOGRAPHICAL ESSAY ON BASUTOLAND.



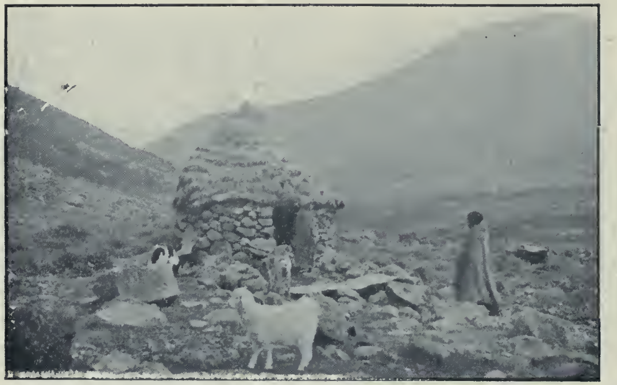
Near Maseru. Lancer's Gap in Skyline formed by weathering of dolerite in sandstone hills. Village on sandstone ledge. Donga in front.



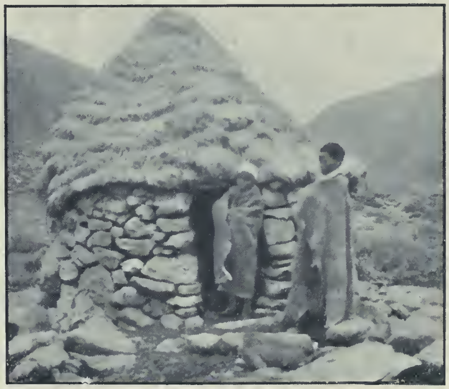
Near Leklatsa's Village. "Pack Saddle" on right is outlier of Berea Plateau. Leper Settlement in belt of trees.



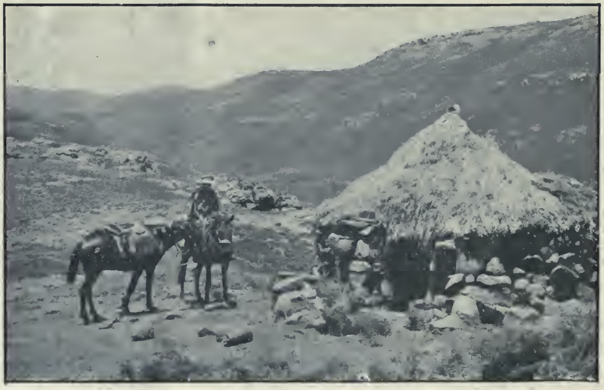
Treading out wheat with oxen, Berea Plateau (cave sandstone).



Cattle post near Thamatuwe.



Dry masonry, grass thatching, sheepskin cloak, knitted woollen cap.



Cattle post, head of Quthing R.

AN ETHNO-GEOGRAPHICAL ESSAY ON BASUTOLAND.

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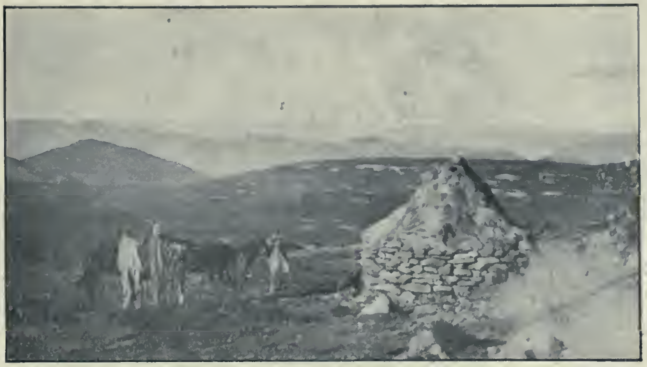
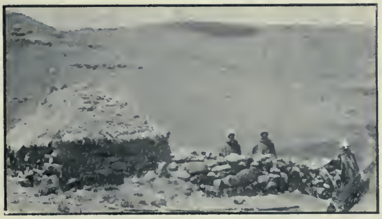
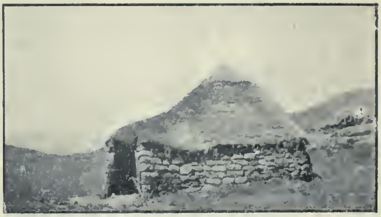


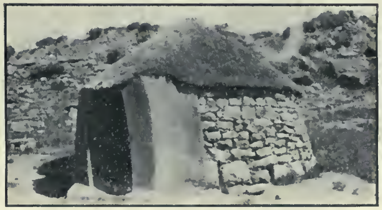
Plateau with cattle post near Lehaha la Sekonyani (9,000 ft.)



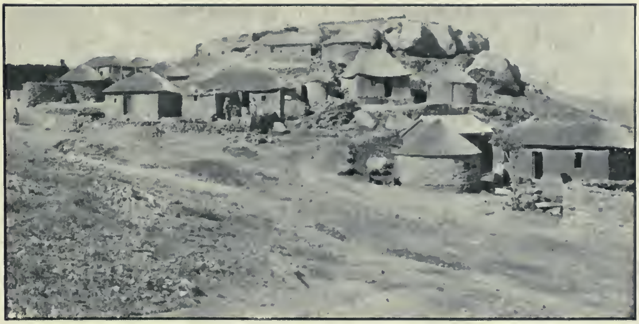
Police Hut, Ongeluk's Nek: dry wall.



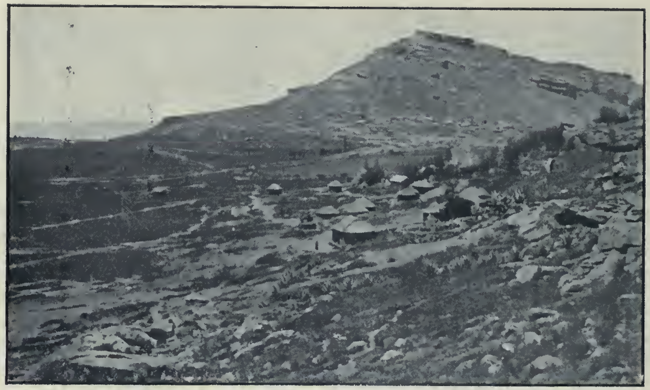
Hut doorway with porch.



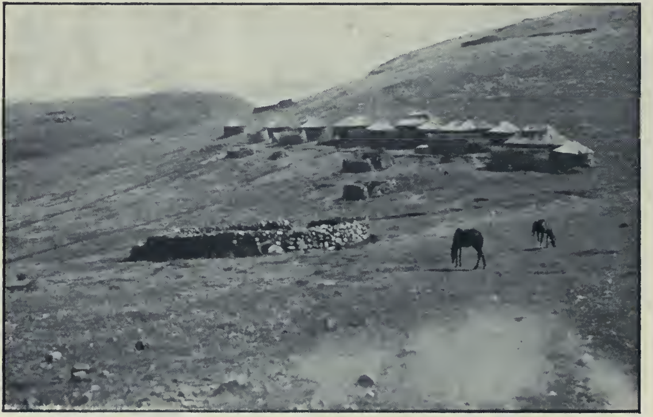
Hut with mud porch.



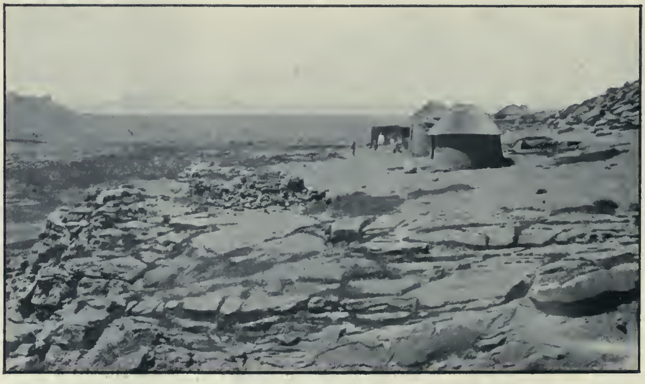
Basuto Village: Native quarter, Maseru.



Leklatsa's Village on hillside. Sandstone country, fields below.



Huts with lelapas of reeds facing N.E.
Stone cattle kraal foreground. Near Ntauti's.



Basuto Village: rock platform overlooking cultivated fields.

Pack animals in the uplands.

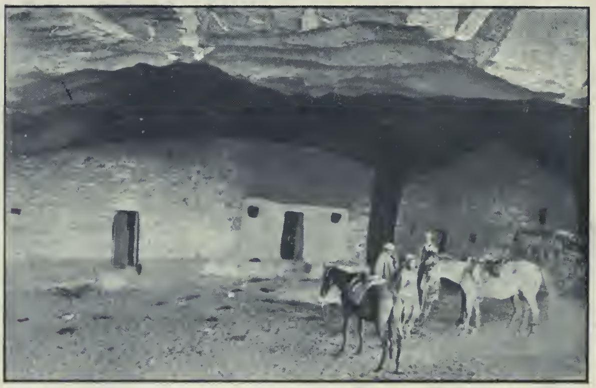
The same.

Moletsani: Cave sandstone middle ground.
Volcanic lavas background. Basuto ponies.

Land degraded through overstocking.

Mountain pastures, goats, near Ongeluk's Nek.

Nkorro: overlooking Orange R.



Part of village in a cave of the sandstone. Near Sehlabathebe.

Ravine in Cave Sandstone: Sehongbong R.

THE CINEMATOGRAPH IN SCHOOLS.

THE Imperial Education Conference has appointed a Committee, with Lord Gorell as Chairman, to consider the above question. Mr. Ernest Young was appointed by the Council of the Geographical Association as its representative on this Committee, and in November, 1923, the Council asked Mr. Young to form a sub-committee, including Miss Bamber and Mr. Leonard Brooks, to consider the matter further.

In order to help this Committee, will you please fill in the replies to the appended questionnaire, and forward them to Mr. Ernest Young, M.A., 73, Gayton Road, Harrow, at your earliest convenience.

There is also need for specimens of model film scenarios, i.e., lessons in scenario form of 30—40 minutes' duration. These specimens could then be submitted to film producers in order to find out possibilities of production and cost. Will any member who can prepare such a scenario please send it as soon as possible to Mr. Ernest Young, M.A., 73, Gayton Road, Harrow, on the understanding that the author's official rights will be safe-guarded.

QUESTIONNAIRE.

1. Name of School.
2. Address.
3. Number of Pupils.
4. Between what ages?
5. Have you had any experience in using films as part of the ordinary school curriculum? If so, please state details.
6. Have you at present a Cinematograph Projector?
7. How frequently is it used?
8. Would it be used more frequently if an adequate supply of suitable films were available?
9. Is the Cinematograph used in connection with the ordinary School Curriculum, or merely as an adjunct to school work outside school hours?
10. How do you obtain films?
11. State nature of films so far obtained.
12. Do you co-operate in any way with any local Cinema? If so, please state details.
13. What is your opinion of the value of the Cinematograph as an adjunct to existing methods of imparting instruction in schools?
14. What subjects do you consider can be successfully taught by the film?
15. Apart altogether from the question of cost, would films be used by you for school purposes? If so, how many school lessons could be given in a week?

RAILWAY GEOGRAPHY.

A discussion on this subject was held at our Annual Meetings, when Mr. Bell, Assistant General Manager, L.N.E.R., presided. We print below a report of the two opening papers.

LL. RODWELL JONES, B.SC., Cassel Lecturer at London University School of Economics.

WHEN I was asked to address you on the subject of Railway Geography at this meeting, I felt inclined to adapt the dictum of the immortal Betsy Prig, and to say—"There ain't no such a subject."

True, some of us have the privilege of conducting classes in a subject so labelled for one of the Great Railway Groups. There we are concerned with a study of the economic geography of the British Isles with special reference to the production and requirements of certain areas, and to the characteristic traffic consequent upon such productions and requirements. It is a geography of coal field, of localised industries, of ports, and of the more definite agricultural belts.

But that is but a selection of general geography considered suitable for transport classes in a private arrangement between the Company and our respective Universities. I shall not allude to it further, save to take this opportunity of stating that, whatever the outcome of such classes, I, as one of the lecturers concerned, cannot be too grateful to the Company, and to our Chairman in particular, for the prompt assistance which I have received in all preparatory work, and, above all, for that freedom of initiative, that permission to tackle a job in one's own way, which you as fellow teachers know how to prize, and the denial of which to either teacher or taught is a negation of education.

No, there is nothing in our railway geography which is not proper to the subject as a whole, and though it is possible and advisable to select geographical material especially appropriate to classes of transport workers, such classes will probably be most effectively conducted by geographers with a wide general knowledge of their subject. Since, then, I have been left entirely free to follow my own line at this discussion, and since I am not going to discuss Railway Geography as a subject, or the classes at present held in it, I propose rather to speak of the railway as a geographical factor, to speak, in fact, of what the railway man has to teach the geographer rather than of what the geographer has to teach the railwayman. And I will not forget that I am addressing an audience of geography teachers, so that I may choose my examples here, there and everywhere, and know that you can supply the connecting links.

Of the engineering activities of the late 18th and early 19th centuries, those relating to transport evolution were the most fundamental, for they made all else of that period possible. The localisation of industry and the great segregation of population were obviously entirely dependent upon improved transport services, road, canal and rail, with the railroad as the most effective factor.

But I will not stop to elaborate or maintain a thesis so generally recognised, and refer to it here only because I am convinced that a study of the evolution of transport can be made one of the most interesting means by which children may visualise the economic and social environment of their forbears, and be made to realise not only that great changes have taken place, but that great changes are taking place; that these very times in which we live are a part too of history. Our literature is rich in appropriate references, and I need not remind you who are teachers that it is not the broad generalisation, but the actual example, in all its detail, which intrigues the interest of a child.

But quite apart from the fundamental changes involved in, and dependent upon varying transport conditions, it is necessary sometimes to look a little into the past to explain the present, and it is that function of explaining which has been so emphasised in Modern Geography. Too much emphasised probably, for it is in the teacher's very bones to make explanation easy; while the docility and receptivity of students wins my constant admiration.

An explanation ceases to be of much value when it is learnt by heart—more especially if it be inaccurate. The relation of cause and effect in a consideration of environment and human activity is seldom simple, however much we may wish it to appear so.

Let me take an example which recently came to my notice in my drab business of examiner. An examinee expressed the opinion that Chicago owed much to the fact that rails from the west were bound to come at least as far south as the extremity of Lake Michigan in their routes from West to East. Possibly this was an explanation taught. I prefer to treat it as an inference from the map, and I certainly will not deny that there is something in it. But very little I think, for, as you know, and as a rail map of 1860 shows, Chicago was not a concentration point of west to east route merely, even supposing such a concentration of through traffic could in any way affect urban growth; it was and is first and foremost a terminal. Railway construction in Wisconsin, Indiana and Illinois concentrated at Chicago, because it already was Chicago—the lake terminus, the extremest embayment of that great waterway system into the very richest of the prairie lands—the point of arrival of both early supplies and of settlers, and of shipment of some of their produce, with its exact siting dependent upon the little Chicago river and Calumet creeks.

And so to-day Chicago is the terminus of lines. It has, of course, its modern belt lines, as must, of course, any big city, and particularly any big port.

We have, in fact, in some instances at least, repeated in the new continent the railway evolution of the old, the initial stages being the linking up of places already of importance, i.e., in the Central Lowlands of North America, usually of river ports. And this leads me to another point which I think is often neglected. In town growth, as in industrial growth, it is in the initial stages that natural physical factors were all important. There is hardly a town, hardly a village in this country, for the exact siting and early growth of which physical factors, often discernible on the large scale map, often on the geological map, will not indicate the *raison d'être*. But what of the physical factors provided by man? What of the many miles of carefully prepared surface, of cuttings and embankments, of bridges and culverts? The first rail connection to a town provided often a physical factor more stimulating to its growth than any which had been effective previously. And with increase of growth came other railway links.

The original interior city of N. America, sited, shall we say, because of a break in river navigation, or because of the junction of two navigable streams, with the break of bulk, the handling, the commerce and the industry proper to such a position, became a railway junction. With the bridging of the river—a big task for one of the wide flood plain of a great continental stream—the bridge itself, too expensive to repeat, would be used by and would attract other railway links, and from its small beginning as a model river port the great industrialised railway centre would arise, its position fastened and rendered permanent in the great net of steel of which it became the focus. When the examinee—he has all my sympathy—continues to tell me that the Mississippi is a great highway, and that almost every considerable city of the Central Lowlands of North America depends upon its water connection, he should add that he is speaking of the 50's—80's of last century. As far as transport only is concerned, and apart from a small coal handling on the Upper Ohio, it would not affect the great river cities if the whole Mississippi basin dried up to-morrow. Even the traffic of the great lakes, great and important still, is no longer concerned with general cargoes, but is confined almost entirely to iron ore, coal, grain, timber and stone. The huge works of Chicago, Gary and Milwaukee, even those with lake-side facilities, forward most of their traffic, even bulk traffic, by rail. I have not time to elaborate this point of railway and waterway. It is a big subject. I am only pleading that as geographers we should seek for detailed and precise information with regard to particular cases, and avoid inaccurate generalisations.

I have been trying to emphasise the importance of the railway as an artificial yet physical factor in the evolution of that great urban growth, which for good or ill, is so significant a fact in modern development. It is not, of course, the complete argument. It would seem almost in recent times that the most powerful factor at any stage of growth may well be the very size of the population already attained at that stage, and we may find reasons for this. A great urban centre is not, of course, self-supporting, but rather forms the ideal market for foodstuffs and for the raw material of industry—ideal in the very concentration of its final zone of distribution and collection. It provides also a ready and varied labour supply and the possibilities of the economic re-assortment of such labour.

Then, again, the ramifications of any great industrial organization are intricate and widespread, yet it must have its nerve ganglion—its directing centre—where reports are received and whence impulses are propelled to the very limits of the system. And each directing centre, with its offices and personnel, is best placed when in proximity to other directing centres. The very possibility of personal communication is important. Thus banking, industrial, transport and newspaper concerns, aspiring or already great, must have their central offices in cities such as London, New York, Paris or Berlin. Every additional quota to provincial population, whether industrial or agricultural, has its counterpart in metropolitan expansion. And the whole thing implies and is dependent upon those great modern transport developments which enable millions to live in a restricted area, drawing their supplies from enormous distances, and distributing their products as far. Each urban centre of certain size was a point of attraction to the earliest transport links, and with each connecting link, a city added a material and permanent factor for its continued expansion; while the very wealth and political pressure potential in a great city, are sufficient to secure, at long last sometimes, that constant development of terminal facilities which alone can overcome the congestion incident to rapid growth. This is all true of the great Metropolitan centres; but even in definitely agricultural areas modern transport has rendered possible a shifting of what was almost domestic industry to urban centres. The preparation of cereal foods, the meat packing establishments, the cheese factory, the creamery, the fertilizer factories, all represent not so much entirely new classes of production, as a shifting of certain farmhouse and village activities to urban centres.

So far I have spoken of the railway as something superimposed upon an existing social organization—profoundly modifying it, it is true—hastening the growth of this well served centre, and stultifying the expansion of that neglected town; rendering possible the localization of an industry here and ensuring the cessation of some old-time production there; yet itself with its earliest connections completely determined by the then existing centres of population.

We see quite a different mode of development in the very newest of lands—one in which the railway precedes and encourages settlement. Much of Western Canada was well-known before the railway era there. The Fur Trading Companies had settled there for generations. Lord Selkirk's little colony, founded in 1864, maintained a precarious existence about Winnipeg itself; but Western Canada, one of the granaries of the world, came into existence only in 1886, when the C.P.R. reached Winnipeg, and railway construction and settlement have proceeded *pari passu* ever since. Other factors, e.g., the prairie condition of soil and climate, the adaptation and selection and breeding of grains, all had to wait for the main factor in development, the railway. Almost no wheat is grown more than twenty miles from a station, and even so the carriage from field to country elevator bulks large in the total freight costs from field to Liverpool.

In an old country the railway was fitted into the then existing scheme of urban settlement. In a great new country it provides always the paramount factor in the distribution of settlement. All the more reason, therefore, that a just appreciation of the possibilities of development of the land traversed should be in the minds of its promoters.

So far I have been speaking of the railway as a geographical factor—a semi-permanent adjustment of the very topography of a country. I have a word to add as to the importance of the railway in the localizing of industry. The fundamental fact that local industrial specialisation both encouraged and depended upon transport evolution is too obvious to need insistence here. Rather than the fact that the railway enabled certain industries to be concentrated upon certain coalfields in this country, I would emphasise the fact that the railway has often permitted the survival of industries in areas unfavourable to modern requirements.

All over Western Europe the pre-railway textile areas were of one type, the upland or relatively infertile lowland, of little value for cultivation, yet suitable for sheep, the water gradient for wool washing, for fulling mills, and later for power.

In Normandy, in the Vosges, in Saxony, in Silesia, and in many other instances that will occur to you at once, the pre-railway industry was of this type. And such has been the inertia of the industry so localized that the existence of more advantageous sites has only partially been effective on the continent. The most modern Alsatian cotton mill is right down on the Rhine plain, yet the smaller Vosges valley factories are still in existence, though they have a longer lead for their coal, and now use very little water power. The more modern centres in Saxony are on the coalfields, but the hill industry survives. Even in this country a considerable part of the textile industry remains in its pre-steam location, on the coal measures of the geologist perhaps, but some distance from the areas of actual output. In fact, the more developed the transport agency the more independent will any industrial concern be in the matter of location. We have to reckon with the facts:—

(i). That few industries *can* be situated in proximity to *all* their raw material and markets.

(ii). That transport charges are only one, albeit an important factor in final costs, and that many other factors in the siting of a factory may be of more economic importance than its mere distance in miles from such and such a source of raw material. Always we need to bear in mind, too, the fact that the costs of terminus handling bulk very large in total transport charges, more especially as the rates charged are rarely directly proportional to the distance, and, indeed, are often special rates originally instituted for the development of a certain traffic.

Only in certain very heavy bulk products, e.g., iron and steel, cement, etc., are the sources of raw material now the primary factors in location.

I am mentioning these rather obvious facts, not because I think that you are not well aware of them, but because we all need to be a little careful of a tendency to over-explanation, to making things appear simple. It is a natural enough fault. The most striking characteristic of the revival of geography was its concern with cause and effect—with the determinative influence of environment. And very rightly, for the subject abounds with instances in which the geographical factors are clearly paramount. Because they are simple in some cases we must not make them appear so in all.

We have, indeed, to give as far as is possible a reasoned and reasonable account of phenomena, but our main concern is to select, to visualise, and to describe what is significant in the present geographical distribution of agriculture and of industry.

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A railway is a fact of Human Geography—its lines with their embankments and bridges, cuttings and tunnels, its stations and sidings with their buildings and approaches, are all very definite facts which Man has, for his own purposes, impressed on the face of the earth; and hence they are part of the subject matter of geography.

These facts are evidently very closely related to many other geographical facts. The efficient and economic working of a railway between any given points demands a minimizing of the gradients and of the distance; so that the builders of the line must take into account every detail of the relief, and all the physical obstacles of hill or river or marsh or sea-inlet, all of which influence the actual position of the lines and junctions, and the costs of construction, of maintenance and of operation.

But the reciprocal relations of a railway system to other facts of human geography in the area it serves are closer, more important, and much more complex than its relations to the physical features. It may usefully be regarded as an immense and complex tool built up in order to provide a part of that rapid and reliable bulk transport which is essential to the existence of modern civilization. As such it depends directly on the factors which localize the demands for transport—on the distribution of the population over the land, particularly where it is concentrated into towns which are necessarily foci of the demands for traffic facilities; on the positions of mines, of harbours, and of other forms of natural resources. And in turn the railway influences the position and growth of towns, aiding some and leaving others to decay, and in some cases even making new towns; it may help to re-distribute population, to give access to resources which were formerly inaccessible and therefore dormant, and to determine the localization of some industries and commercial centres.

Many of these factors may be noted conveniently under the two heads of what I have elsewhere spoken of as Areas of Supply and Areas of Demand in relation to human needs.

Areas of Supply are districts in which the inhabitants produce foodstuffs, or raw materials for industry, or some manufactured goods, in quantities greater than are needed to satisfy their own requirements; so that they have a surplus for exchange with other districts.

Areas of Demand are districts whose inhabitants need food, or other raw materials, or manufactured goods, in excess of the quantities they themselves produce, and who therefore require to import such commodities.

Evidently there are very few districts, and those only under conditions of savagery or barbarism, which do not come under at least one of the above headings in respect to some essential goods. No part of a civilized world is, or can be, completely self-sufficing. Almost every district is an area of supply for some important commodities and of demand for others.

Hence arises the vital need for transport in civilized society. Every civilization has been dependent on, and closely influenced by, its principal modes of transport. China has been termed the "land of rivers." Rome is remembered almost as well by the roads, whose remains mark every land over which her power extended, as by the social organization of which those roads were a material expression.

The most distinctive and characteristic feature of the enormous increase in Man's power over Nature which marked the last century was the successful application of mechanical power to transport in the steamship and the railway. The century just closing has been the Railway Age. And while the railway is not now so completely dominant as it was forty, or even twenty, years ago it is still by far the chief means of transport on land, and it has probably not yet reached its period of maximum usefulness.

Among its reactions on other facts of human geography we should note that the railway has been the principal agent in making possible the characteristic modern concentration of our population into large group-cities or conurbations, and in the extent and distribution of many of their suburban districts and satellite towns. Every great city is a concentrated area of demand for foodstuffs, and for many other commodities: it may also be an area of supply of some types of manufactured goods, though the volume of the traffic inward to such a centre is usually greater than that outward unless it is primarily a seaport. The economic advantage and justification of the large city is that which arises from the economy of large scale organization for industry and commerce or for political and social affairs. But the concentration of such masses of people only became possible when the development of rapid and reliable means of transport made it possible to collect the necessary supplies of food, much of which is perishable, with sufficient speed and economy. To this extent it is true to say that the great modern conurbations were created by the railways.

The distribution and character of the many areas of supply and of demand for different commodities, their relative positions, and the extent and character of the intervening areas, are part of the subject matter of geography. The numbers and stage of culture of the inhabitants, and the extent of their dependence on other peoples, which determine how far the resources of each area are or can be developed, are also geographical facts. Hence the study of geography can be one of the most valuable aids to an intelligent comprehension of a railway system, and the part that it plays in human affairs—its actual lay-out, its traffic, and its possibilities of further developments and connections.

Such a study should certainly begin by a study of some fairly definite region, preferably, I hold, one which is readily accessible to the student and at the same time is sufficiently extensive, and varied in its internal features and resources, to give a wide range of examples of the ways in which the railways influence and are influenced by other geographical facts. Perhaps the best example of such a region is that of the old N.E.R., now the North Eastern Area of the L. and N.E.R. This was the home of railways in their infancy, and it has seen the whole evolution of a great railway system. It has also the advantages of possessing what is probably the most comprehensive history of a railway system,[1] and a very full series of statistical records. The Area includes districts of agricultural wealth, rich coal and iron fields, and stretches of barren and uninhabited moorlands: there are densely peopled industrial and mining districts of different types in West Yorkshire and on the North East Coast, contrasting with equally varied agricultural and pastoral districts from Holderness to the slopes of the Cheviots: seaports which vary from the mixed traffics of Hull and the Tyne to highly specialized ports such as Middlesbrough and Blyth, with a huge total volume of traffic both local and for export and import. Its towns include examples of contrasting types of the modern conurbation, in West Yorkshire and on Tyneside respectively; ancient cities of different types and corresponding differences of development in York and Durham, a railway-created town and port at Middlesbrough, and such railway-developed towns as Darlington and the Hartlepools.

In such a region we may study the various areas of supply and demand which indicate the districts between which there is an economic demand for efficient transport and the character of the principal traffics. We may study also the relations of the lines to the surface features of a region of very varied relief, and the influences of those features on the development of the railway system. We have also many instances of the reciprocal influence of the railway on the towns and industries, on the distribution of the population, and on the exploitation of mineral and agricultural resources and advantages of location.

It is clear that such a study can be of very considerable educational value in itself; and to those who intend to make the railway system the scene of their life work, and the field in which they will make a career, it is also a study of great practical value.

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[1] *The North-Eastern Railway—Its Rise and Development.* By W. W. Tomlinson. Published by A. Reid and Co., Newcastle-on-Tyne, 1914.

Statistical Bibliography in Relation to Growth of Modern Civilization. E. W. Hulme. 25 x 19 cm. Grafton and Co. 6/-.

The author is Sandars Reader in Bibliography at Cambridge, and has been Librarian of the Patent Office, and so he is most eminently qualified to deal with the bibliography of science and his efforts to organise that bibliography are deserving of the highest commendation, as those who have had occasion to appeal for his help well know. The book under review draws its data from the International Catalogue of Scientific Literature, and attempts to use output of such literature as an index of modern civilization. The reviewer, a contributor of scientific articles, is afraid this claims too much for science, and the value of the work further depends on the completeness of the indexing. One gathers from Table 4 that Spain and S. America did not get on to the index until after 1904; this may well affect some of the entries in the other tables, and this point may serve as an indication of the difficulty of making such inferences from statistics.

The graphs showing relation between growth of population and number of patents granted are very interesting and well done, and the whole book is interesting and unconventional, whatever one may think of the underlying thesis. The reader must, however, bear in mind the limitations and possibilities of error involved.

EL VALOR GEOGRÁFICO DE ESPAÑA.

Emilio H. del Villar.

Madrid: Sucesores de Rivadeneyra. 12 ptas.

THIS book is defined in its sub-title as an attempt to assess the degree to which the geographical conditions of a particular country, Spain, favour the numerical growth and cultural development of its human population—to express, in other words, what Señor del Villar calls its "ecetic value" (*valor ecético*). A subsidiary purpose, probably the motive of the book, is indicated in the opening chapter; it is that of writing, so far as geography may furnish it, the apologia of modern Spain. With this second purpose we are in special sympathy, for the position of Spain among the nations of the modern world is to be properly interpreted neither by the foreigner nor by her own intellectuals, without a full appreciation of her very peculiar geographical conditions.

It is unfortunate that, in the opening chapter, much of the argument with which the author meets the current rhetorical argument of the "decadence of the Latin races (so-called)" is itself somewhat loose and rhetorical. It is not, for example, legitimate to apply to ethnic elements laws applicable to algebraic quantities, and to argue that, because a is superior to b, $a+c$ must be superior to $b+c$. Most Englishmen believe that an Englishman is superior to a German; it does not follow that the offspring of an Anglo-Spanish marriage is superior to that of a German-Spanish marriage; the contrary is, in fact, maintained by many Englishmen resident in Spain.

A somewhat racy opening chapter should not mislead the reader regarding the real character of the book. It is a comparative study based on statistics from authoritative sources, which fall into three main classes: Firstly, statistics of absolute and relative population, with percentages of urban concentration; secondly, statistics of industry; these two classes represent man and his material culture; thirdly, statistics dealing with natural resources in metals, minerals and water-power and with rural productivity; this class deals with the natural environment. Somewhere between the second and third classes fall statistics of movement. For obvious reasons, statistics of the census for the decennium preceding the war are used for purposes of comparison. Some of the statistics chosen seem, however, to be needlessly out-of-date.

The method of treatment consists in ordering according to magnitude the statistics of each kind referring to the various countries and observing (i) whether this arrangement can be described in terms of geographical zones, and (ii) what parallelisms exist between the statistics of the three classes.

The broad facts, so far as they affect Spain, which emerge from this comparison are:—

I.—European countries, ordered in respect of statistics of the first class, fall into well-marked geographical zones. A kernel, characterized by a combination of great general density of population together with high urban concentration, is formed in north-west Europe by England and Wales, Belgium, Holland, and Germany. (A study by regions would extend this to include the South of Scotland and part of Northern France). From this kernel outwards, both density and concentration decrease in all directions, but the density decreases more rapidly to the north and north-east, where Finland and Norway have respectively 8.3 and 7.4 inhabitants per Km^2, while the concentration decreases more rapidly to the south-east and east, where Bulgaria, although it has 45 inhabitants per Km^2, has an urban concentration of only 2.3 per cent.

In Southern Europe there is a discontinuous Mediterranean zone, broken into by Italy, which, although it has a Mediterranean concentration, 15.4 per cent., has a Central European density, 121 persons per Km^2, almost identical with that of Germany. Within this zone, Spain with density 39 and concentration 14 per cent., is clearly differentiated from Portugal and Greece, which have higher densities, particularly Portugal, but a markedly lower degree of concentration (Portugal, 9.9; Greece, 9.1 per cent).

II.—The indices expressing cereal productivity i.e. the average annual yield expressed in metric quintals per hectare sown, although they do not show complete parallelism with the indices of population in Northern Europe, do at least express the broad distinction between north and north-west on the one hand and south and south-east on the other. Thus the wheat indices in the south and south-east vary from Portugal, 6, to Bulgaria, 11.4, as contrasted with a series of indices for Northern Europe beginning with Germany, 20, and ascending to Denmark, 29. Between these two series lie Norway and Sweden, much displaced relatively to their position in the population-tables, and France, Austria-Hungary and Rumania, which are countries of transition to the Mediterranean and south-eastern zones. It is interesting to note that the Spanish index, 8.9, is of the same order as those of the United States, 9.4; Argentina, 7.3; European Russia (with Poland), 7.1.

It should be said that Señor del Villar considers the cereal productivity, as above defined, to be a sufficient index of the entire rural productivity. The productivity in stock, depending partly on certain cereals, partly on pasturage, is, in his view, " in perfect harmony with the yield in cereals." We doubt whether this harmony is more than a rough parallelism; certainly, if the cereal indices alone are taken as the expression of rural productivity, discrepancies with the statistics of population arise which are not explicable by reference to industrial and other tables.

The reader must also remember that, as the figures refer to the area sown, they do not take into account the intensity of the rotation, and should not, therefore, be taken as expressing the relative " values " of the countries in respect of cereal cultivation. In Spain, for example, some 47 per cent. of the total area in the cereal system is lying fallow in any one year, and we gather from Señor del Villar that this indicates a less intense rotation than that prevailing in other countries represented by similar indices. Again, as actual production is the measure of productivity, the human factor is not quite eliminated, even after reference to other "natural" tables. This is probably illustrated by the position of Denmark at the head of the indices for wheat.

III.—Superimposed on the relation between density of population and rural productivity are two other parallelisms, more fluctuating in their character; that of the figures expressing metallic resources with the urban concentration and that of the figures expressing potential power (coal resources and water-power) with both the general density and the urban concentration. The relation between resources in metals and urban concentration is seen most typically in the case of the region of the Rocky Mountains, where the density of population over an area of two and a quarter million hectares is only 0.9 per Ha., while nearly 16 per cent. of the population is gathered in urban groups of 25,000 persons or over.

Vide Geographical Journal, Dec., 1923, p. 450.

The great metallic resources of Spain give rise to no great urban groups and are not paralleled by any high general percentage of concentration, although they undoubtedly give rise to a notable local intensification of life within restricted zones.

The relation between population and resources in coal and water-power scarcely needs comment. The deficiency in coal of the Mediterranean zone is very striking. Spain alone of the countries of this zone has any considerable reserves of coal, about 8¾ million tons (contrast Germany, 423, and Great Britain 190). Italy is differentiated from Spain by her superior water-power, due mainly to the more favourable position, greater rainfall, and larger area of glaciation of the Alps as compared with those of the Pyrenees. The water-power of Spain has been conservatively estimated at 5 million h.p. Actually, in 1920, some 620 thousand h.p. was being utilised (an increase of 42 per cent. on the 1918 figures), and works in course of construction accounted for some 260 thousand h.p. more. Spanish engineers calculate that 1 h.p. corresponds to 6 tons of coal.

The average coal production of Spain in the years immediately preceding the war was about 4 million tons per annum; during the war it became necessary to increase the extraction, while at the same time the rise in the price of coal made it possible to meet the cost of extraction from less favourably situated seams; thus, by 1918, the extraction had risen to over 7 million tons, and, though the amount is now decreasing, some of the advance on the pre-war figures may be permanently maintained. It should be remembered in this connection that of the Biscayan iron ores, some 84 per cent is exported, mainly to England, on account of the greater economic attraction of the English coal-fields as compared with that of the Asturian fields, and that the amount of the pyrites ores of the south which is treated in Spain itself is a small fraction of the total ore extracted.

IV.—The facilities for transport in a country and its position with respect to the great lines of traffic are the principal factors which lead to high urban concentration. This relation is illustrated by the case of the North American region formed by the compact group of States: Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Pennsylvania, Delaware, Maryland, and the Federal District. The enormous preponderance of this group over other regions of North America (density: 69 persons per Km^2; urban concentration in groups of 25,000 and over: 54 per cent.) is explicable not merely by its general location within the rainfall zone of 1,000 mm., and by the inclusion of the Pennsylvanian coalfields with a production nearly equal to one-half of that of the whole of the United States, but also by the position of the region between two great waterways —the Atlantic Ocean and the Great Lakes system. The position of Spain in respect of transport facilities is not perhaps very justly indicated by its relatively high position in the table showing the total foreign traffic by sea alone of the European countries. Spain, with 38 million tons, occupied in this list (the year is 1908) the fourth place next to the United Kingdom, France, and Germany, and considerably above Belgium, 27 million, and Holland, 26 million tons.

The characteristic of the Spanish maritime trade is its diffusion among a number of ports. The principal port, Bilbao, accounted for only 11 per cent. of the total; contrast this with Lisbon, which absorbed 37 per cent. of the foreign maritime trade of Portugal.

We are unable to deal here with three very valuable chapters treating in somewhat closer detail the two American continents. The greater part of the book is, of course, occupied with a detailed treatment of Spain itself. A short analysis of the rural exploitation of Spain, from which principally its ecetic value is derived, may be taken as typical of this section. The total surface under rural exploitation in Spain in 1915 was 44,223,135 Ha., of which the yield was valued at 4,739,214,995 ptas.

The surface was divided as follows:—

Cultivated	Cereal system	34.3 per cent.
	Other herbaceous cultivation	2.8 ,,
	Woody cultivations (olive, vine, fruit trees)	7.6 ,,
Spontaneous Vegetation	Industrial plants	1.64 ,,
	Meadows	1.55 ,,
	Dry pastures	52.11 ,,
		100.00 ,,

The author points out that the "cerealization" represented by these figures is excessive and uneconomic; nevertheless, the area of the cereal system is being steadily extended. Cerealization may be proper and economic in countries where the natural vegetation is herbaceous, as in Northern and Central Europe, where the climatic conditions favour pastures, and where the forest, if destroyed, gives place to herbaceous vegetation, which also replaces the cereals when these cease to be cultivated. In Spain, on the other hand, the climate is, in the main, favourable to a woody vegetation, and the vine and olive are, from this point of view, indicated as the natural objects of cultivation. At the same time, the clearing of the forest, though for a time it makes available for cereals a scanty soil-reserve, leads to degenerate scrub-forms of vegetation when this reserve is exhausted. This process Señor del Villar calls expressively "desertization by cultivation."

The comparative value of the various products is suggestive. The average annual value of the dry pastures is only 6.8 ptas. per Ha., equal to about 2s. 2d. per acre. Among the cultivated products those of the cereal system are the least valuable, 145 ptas. per Ha., as compared with the olive, 169, and the vine, 286. It is interesting to note that the vine and the olive are, economically, in different classes. No hasty conclusions should, however, be drawn from these figures; the author does not think that the world demand for either olive or vine permits much extension of the area exploited in these classes.

To sum up, the ecetic value of Spain is being gradually destroyed by the rapid extraction from the mines, which benefits mainly the owners of the mines and the countries to which the ore is exported, and by the clearing of the woods to extend a poor cultivation of cereals. The "draining of the life-blood" of Spain by the steady stream of emigration to Latin America Señor del Villar rightly puts in a secondary place as a natural phenomenon consequent on a low and decreasing ecetic value, and, for the rest, indicative of racial vigour.

His suggestions for arresting the wastage of capital values are:— On the one hand, a slowing-down of the ore extraction and an increased treatment within the country of the extracted ore, more particularly an increased manufacture of fertilizers from the pyrites ores of the Huelva province; on the other hand, a reduction in the area of cereal cultivation in favour of forage with a view to a great increase in the stock raised. Without natural manure the artificial fertilizers cannot be used to advantage under the climatic conditions prevailing.

Señor del Villar has written a most interesting and suggestive book, which no student of Spain can afford to ignore. R.A.

SOME RECENT ARTICLES OF GEOGRAPHIC INTEREST.

THE Association is here inaugurating an effort to inform our readers of the chief articles appearing in a number of well-known journals. We hope to extend the list of journals in the near future. For the work involved we are indebted to Mr. R. A. Pelham (Univ. Coll. Wales, Aberystwyth), who has volunteered this invaluable help. The present list covers July—December, 1923, save for the two last periodicals, for which the period covered ends in October.

Abbreviations.—GJ—Geographical Journal; SGM—Scottish Geographical Magazine; AGR—American Geographical Review; AdeG—Annales de Géographie; Z—Zeitschrift der Gesellschaft für Erdkunde, Berlin; PM—Petermann's Mitteilungen.

EUROPE.

J. H. Reynolds	GJ, Sept., 1923	The High Tatra (mainly geomorphology, also flora and fauna—illust.)
J. F. Unstead	SGM, July, 1923	Belt of Political Change in Europe (geomorphology and demography).
J. Hamilton	SGM, Oct., 1923	Republic of San Marino (historical sketch and general description).
L. Gallois	AGR, July, 1923	Origin and Growth of Paris (diagrams and illustrations).
C. Biermann	AGR, July, 1923	Franco-Swiss Free Zones (L. Geneva as a link between France and Switzerland.
E. M. Sanders	AGR, July, 1923	The New Roumanian State (geomorphology, resources, effect of Great War—well illust.)
Eugene Romer	AGR, July, 1923	Population of Poland (census of 1921—also distribution of domestic animals).
Sten de Geer	AGR, Oct., 1923	Greater Stockholm (city planning—influence of geographical position).
P. Tesch	AGR, Oct., 1923	Physiographic Regions of the Netherlands (illust.).
Em. de Martonne	AdeG, July, 1923	Var Delta and Valleys of Maritime Alps (mainly geomorphology—illust.)
G. Rolletto	AdeG, July, 1923	Hemp Cultivation in Italy (diagrams).
Ph. Arbos	AdeG, July, 1923	Lace Industry around Le Puy (rural industry and effect of machinery).
D. Faucher	AdeG, July, 1923	Present State of French Silk Culture (displacement of mulberry trees by vines) .
R. Hainneville	AdeG, July, 1923	Cherbourg as a Transatlantic Port.
Auguste Jardé	AdeG, July, 1923	Internal Navigation of Europe in 1921 (effect of Great War).
A. Briquet	AdeG, Sep., 1923	Coast Dunes (mainly geomorphology)
Mlle M. Lefèvre	AdeG, Sep., 1923	Density of Houses in Belgium (coloured map).
P. L. Michotte	AdeG, Sep., 1923	Ship Canal and Port of Brussels (details of water-borne trade).

Ph. Arbos	AdeG, Sep., 1923	Water Power in the Massif Central.
F. Kolacek	AdeG, Sep., 1923	Earthquakes in Czecho-Slovakia.
L. Gallois	AdeG, Sep., 1923	Treaty of Lausanne (boundaries of Turkey).
Ph. Arbos	AdeG, Sep., 1923	The Port of Danzig.
P. C. d'Almeida	AdeG, Nov, 1923	Poland (full treatise—cf. 1921 Census in AGR of July, 1923).
H .Cavaillès	AdeG, Nov, 1923	Deep Valley of the Pau Torrent (glacial action and irrigation on N. slopes of Pyrenees).
Ang. Chevalier	AdeG, Nov, 1923	Disafforestation of Alps.
J. Levainville	AdeG, Nov, 1923	Polish Metallurgy.
F. Leyden	Z 1923, No. 5-7	Settlement in Flanders (demography, place-name distribution, etc.)
E. Schev	Z 1923, No. 5-7	Modern and Tertiary Ria Coasts in Sardinia and Corsica.
N. Krebs	Z 1923, No. 5-7	Distribution of Population and Geographical Units in S. Germany.
J. Sölch	Z 1923, No. 5-7	Recent Research on Glaciation in Germanic Alps.
H. Weber	PM 1923, No 5-6	Earthfalls on Gossel Plateau (Thuringia).
F. Heritsch	PM 1923, No 5-6	Alpine Morphology, Graz District (detailed analysis of phases of movement).
E. Oberhummer	PM 1923, No. 5-6	War Maps of Albania.
A. Burchard	PM 1923, No 7-8	Step formations in Alpine Valleys (especially Oetztal).
R. Pohle	PM 1923, No 7-8	The North Ural (geomorphology).
A. von Stahl	PM 1923, No 7-8	A Journey to the Ural.
K. von Hahn	PM 1923, No 7-8	Trade and Communication in the Caucasus in former times.

In each number of PM a review of current exploration.

ASIA.

F. Kingdon Ward	GJ, July, 1923	From the Yang-tse to the Irawaddy (topography, glacier types and flora).
B. G. Tours	GJ, Aug., 1923	Overland Journey—Chungking to Haiphong (general description of country and inhabitants—illust.).
C. J. Morris	GJ, Sept., 1923	The Gorge of the Arun (topography and people of Nepal—illust.)
J. W. Gregory	GJ, Sept., 1923	Note on Map of Sladen Expedition to Yunnan, 1922 (map—orographical—of Upper Salween, Mekong and Yang-tse).
H. St. J. B. Philby	GJ, Oct., 1923	Jauf and N. Arabian Desert (geology of Juba depression—illust.)
A. L. Holt	GJ, Oct., 1923	Future of N. Arabian Desert (lines of communication—map and illust.)
Rosita Forbes	GJ, Oct., 1923	Visit to Idrisi Territory in Asir and Yemen (illust.)
R. Cheesman	GJ, Nov., 1923	From Oqair to Ruins of Salwa (Persian Gulf—map and illust.)

J. K. Tod	GJ, Nov., 1923	Kalat-i-Nadiri (N.E. Persia—illust.)
	GJ, Dec., 1923	The Lushan District of Kiangsi (maps and illust.—geology of region).
H. L. Shuttleworth	AGR, Oct., 1923	Wool-mart of Indo-Tibetan Borderland (illust.)
W. Schmidt	PM 1923, No 5-6	The Coast of the Hejaz (geomorphology).

AFRICA.

Francis Rodd	GJ, July, 1923	A Journey to Air (structure of district and account of Tuaregs—illust.)
Maudslay Baynes	GJ, Nov., 1923	Notes on Okovango and Kunene Rivers (S.W. Africa—water supply —maps).
A. Stigand	GJ, Dec., 1923	Njamiland (hydography, flora and fauna—illust.)
J. Roscoe	SGM, July, 1923	Negro-Hamitic People of Uganda (traces of former civilisation—map and illust.)
R. Lespès	AdeG, Nov, 1923	The Port of Bona (trade in minerals —map showing ore beds).

AMERICA.

Ll. Rodwell Jones	SGM, July, 1923	Geographical factors controlling Spanish advance into N. Mexico and S. California (maps and wind roses for Pacific coast).
R. R. Wallis	SGM, Oct., 1923	Evolution of High Plateau of Brazil (sketch map and illust.)
Roy Nash	AGR, July, 1923	The Houses of Rural Brazil (well illustrated).
H. A. Marmer	AGR, July, 1923	Flow and Ebb in New York Harbour with maps of Georgia and Florida (tidal technicalities).
U.S. Geol. Survey	AGR, Oct., 1923	The Rainbow Bridge (Utah—geology —well illust.)
W. W. Ashe	AGR, Oct., 1923	Eastern National Forests (U.S. timber resources—illust.)
D. Jenness	AGR, Oct., 1923	Origin of Copper Eskimos (E. of Mackenzie mouth—copper culture—illust.)
R. de C. Ward	AGR, Oct., 1923	Fog in the United States (cf. figures given in Ll. R. Jones' article above).
W. Straub	Z 1923, No. 5-7	N.E. Mexico (chiefly geomorphology and demography).
G. Spalt	PM 1923 No 5-6	Lengths of Amazon and feeders.

EAST INDIES.

J. W. Gregory	GJ, July, 1923	The Banda Arc (structure and geographical relations—diagrams, map and bibliography).
Leo Austen	GJ, Nov., 1923	The Tedi River District of Papua (important section on human geography—map).

POLAR REGIONS.

Lauge Koch	GJ, Aug., 1923	Prelim. Report on Danish Expedition to N. Greenland (maps).
M. C. Lester	GJ, Sept., 1923	Expedition to Graham Land, 1920-22 (meteorology, whaling industry—map).
F. A. McDiarmid	GJ, Oct., 1923	Geographical Determinations of Canadian Arctic Expedition, 1913-18.
	GJ, Nov., 1923	The Ross Dependency (political—map).
R. N. Rudmose Brown	SGM, July, 1923	Weddell Centenary and Problems of Antarctica.
J. Davis	SGM, Oct., 1923	Future Exploration of African Quadrant of Antarctica (coast-line E. and W. of Enderby Land—map).
Charles Brooks	AGR, July, 1923	Ice-Sheet of Central Greenland (Swiss Greenland Expedition—map).
W. R. Eckhardt	PM 1923, No 5-6	Ice Age and Shift of Poles (a note).

UNCLASSIFIED.

E. D. Laborde	GJ, Aug., 1923	King Alfred's System of Geog. Distribution in Orosius (tribes of Germania—map).
Ed. Heawood	GJ, Oct., 1923	Hitherto unknown world map of 1506 A.D.
A. E. Young	GJ, Nov., 1923	Note on Prof. Everett's application of Murdoch's 3rd Projection (mathematical).
V. Cornish	SGM, Oct., 1923	Geographical Position of British Empire (explanation of Yellow Peril problems in Australia).
Ph. Arbos	AGR, Oct., 1923	Geography of Pastoral Life.
W. L. G. Joerg	AGR, Oct., 1923	Review of Post-War Atlases.
J. Rouch	AdeG, July, 1923	Object and Methods of Meteorology.
G. Ferrand	AdeG, July, 1923	Nautical Instructions of Sulayman Al Mahri (16th cent.—historical geography).
Max Sorre	AdeG, July, 1923	The World's Sugar Cane.
J. Allix	AdeG, Sep, 1923	State of World's Rubber Production.
Paul Descamps	AdeG, Nov, 1923	Concentration of population among hunting peoples (influence of distribution of animals and vegetation on modes of life).
S. Passarge	PM 1923, No 5-6	Comparative Study of Scenery.
W. R. Eckhardt	PM 1923, No 5-6	Climate Problems (Etesian winds, Rainfall of Bosporus, Rainfall of S.E. Australia).
F. Tamss	PM 1923, No 5-6	States and Peoples (Statistics of the sub-divisions of numerous countries —continued in PM 1923, No .7-8).
W. Panzer	PM 1923, No 7-8	Valley lines and fault lines.

ITEMS OF GENERAL INTEREST.

To ensure irrigation water in Egypt for summer months, a reservoir at Lake Albert has been approved provided that a canal is made through the Sudd region to minimise evaporation. Lake Tsana is also suggested as a source of supply, and a Commission representing all countries interested is regarded as a matter of primary importance. (GJ, July, 1923, p. 55).

The need for irrigation in N.E. Brazil is shown on p. 237 of GJ for Sept., 1923. Fuller information in "Bulletin of Pan-American Union," Jan., 1923.

A new theory on " anchor " or " ground " ice appears on p. 238 of GJ, September, 1923.

A note on Langbeck's article on thunderstorm distribution in Germany (Meteorologische Zeitschrift, Sept. and Oct., 1922) appears on pp. 392-3 of GJ for Nov., 1923.

When the salt lakes of Darfur (Anglo-Egyptian Sudan) dry up, a valuable deposit of carbonate of soda will be left. The lakes contain nearly 5 per cent. solids, of which sodium carbonate is the chief constituent. (GJ, Nov., 1923, p. 394).

It is proposed to build a canal across southern extremity of South America (see GJ for Nov., 1923, pp. 396-7).

A note on Miss E. C. Semple's article on " The influence of geographic conditions upon ancient Mediterranean stock-raising," appears on pp. 397-8 of GJ for Nov., 1923.

A brief analysis of some of the chief points in G. Carle's article on " L'hydraulique agricole et industrielle en Syrie " (La Géographie, May, 1923) is to be found on pp. 467 of GJ for Dec., 1923.

A few notes on cave meteorology (Herr Robert Oedl's article in Meteorologische Zeitschrift, Feb., 1923) are given on pp. 471-2 of GJ, December, 1923.

Interesting details of the white man's responsibility for drought in S. Africa are given on pp. 192-3 of *Scottish Geographical Magazine* for July ,1923. A brief note on Canada's mineral resources appears on pp. 194-5 of the same magazine.

On pp. 256-259 of *Scottish Geographical Magazine* for October, 1923, appear notes of articles on resources of Asiatic Russia, the southern territories of Algeria (chiefly products), and the flora of S.E. Africa.

A note on Prof. Joly's lecture on " The Surface Movements of the Earth's Crust," with reference to the origin of mountain chains, appears on pp. 263-4 of SGM for Oct., 1923. Full report in Philosophical Magazine, 1923, Series 6, Vol. 45, pp. 1167ff.

L' Humanité Préhistorique. Jacques de Morgan. pp xxii + 330. 1921. Paris, " La Renaissance du Livre." 15 francs.

It may be of interest to some readers to know of this interesting, short, and illustrated sketch of prehistoric times, written with a good deal of understanding of other times and ways, as one would expect from such an experienced worker as M. de Morgan. Many points will help teachers of geography to understand the problems of far lands, and the whole sketch is brightly written. To go into detail would be inappropriate in this journal. For our purpose it is interesting to note that the book is one of a long and interesting series on the evolution of humanity. Many teachers would be interested to get the list of these books, which touch history, human geography, and sociology for the most part.

CURRENT LITERATURE.

Mrs. Ormsby, London School of Economics.

PETERMANN'S Mitteilungen (69, Jahrgang, 1923 9-10 Heft), contains a series of tables showing frontier changes, measurement of areas, density of population and name changes, as addenda to the Diplomatic Year Book, for Prussia, Austria, Portugal, Canada, and British Honduras. Portions of East and West Prussia, Pomerania, Brandenburg, Posen, Lower Silesia, Upper Silesia, Schleswig-Holstein, and of the Rhine Province (Trèves and Aachen districts) have been lost by Germany, with a population of nearly 4,600,000.

New population statistics are given for Austrian provinces:—Vienna, Burgenland, Niederoesterreich, Salzburg, etc. All these provinces have had an increase of population, in comparison with 1920 figures, of from 1 to 5 per cent., with the exception of Burgenland.

Portugal's sixth General Census was made in 1920 (published 1923). The density per square mile is quoted for each province.

From the 6th census of Canada (taken 1921 and published 1922), the total population and the origin of population for each province is given. Of the 4.87 million subjects of British origin, 2.5 are English, 1.174 are Scottish, and 1.08 are Irish by origin. The French number 2.45 million, and of the other nationalities, numbering 1.46 million, 400,000 are of German and Austrian origin. There are also about 100,000 Dutch and Russians.

The density of population for British Honduras is given approximately, the areas being compiled from various documents and maps, and the population figures from the Colonial Office list of 1923.

This number also contains a short article by Friedric Leyden, accompanied by a map, showing the variation in density of population in East and West Flanders between 1912 and 1920. He points out the widely distributed decrease of population in West Flanders (which is not to be astonished at), e.g., Ypres in 1912 had 17,529 inhabitants, now, 6,815. Wijtschæte has dropped from 3,529 to 1,236, and so on. Not only the long over-populated districts in the heart of Flanders and in Western Brabant, but places near the Dutch frontier which have suffered severely from the difficulties of international commerce show a decrease, as well as abandoned fortresses like Dendermonde. The writer goes on to show that whereas East and West Flanders show a decrease of 87,271 inhabitants, Antwerp and Limburg and Flemish Brabant have a total increase of 114,952. So that, in spite of the war, the whole of the Flemish area has gained 27,681. This is particularly noticeable in the case of the large towns. The decrease within the towns is more than counter-balanced by the increase in the suburbs. There has been a steady stream of population into the new industrial area of Limburger Kempen, and there has been a marked movement from the " overpopulated areas " of Flanders into the neighbouring industrial areas, especially those of Hennegau and Lille. Certain places like Poperingue and Adinkerke, more or less moribund before the war, seem to have taken a new lease of life. Whether this increase in their population can be regarded as permanent, however, is doubtful.

A very interesting and detailed account of Poland appears in the November number of *Les Annales de Géographie*, written by P. Camens d'Almeida.

The author deals first with the frontiers. The Treaty of Riga, 1921, gave Poland territory which contained a population less than a quarter Polish. The questions of Vilna and Memel were settled so tardily that bad feeling had developed between Lithuania and Poland. Fortunately for the Poles, they were in the position of being *"beati possidentes."* As regards the German frontier, the Powers were obviously biassed by ethnographical maps of German origin, which cannot be said to be impartial. As the result of a plebiscite the Poles lost Masurenland and nearly lost the whole of Upper Silesia. Under cover of the confusion of 1918, however, they were able to possess themselves of Posen, and the Allies were confronted with a *fait accompli.*

The Czecho-Slovak frontier was decided by arbitration of the Council of Ambassadors. It was generally agreed that the Baltic front should be Polish. Here the difficulty lay in the fact that the Poles had never developed any maritime interest and that Danzig was pre-eminently Prussian. Danzig, therefore became a free town, and Poland received only a strip of sandy coast. "Imagine a State of Aquitaine being deprived of Bordeaux and the Gironde, and being granted a few kilometres of the coast from Lacanau to Soulac, and you will see what 'access to the sea' has meant for Poland." It will be a difficult task for Polish engineers to transform Gdynia into a deep water port.

The author goes on to give a very clear general geographic description of Poland, followed by a short study of each of the Polish natural regions. It would take too long to summarise this description here, for it is wonderfully complete, considering that the whole article is contained in about twenty-four pages. For those teachers who do not read German, and, therefore, have not access to Partsch's voluminous studies, a description of this kind should be very useful.

The attention of teachers is directed to an able article entitled *The Essentials of Education,* written by that prince among teachers, J. Arthur Thomson, in the University *Bulletin* for November, 1923. He urges that the pupils should be encouraged to study the world without, both inanimate and animate, and to learn their way about it, they should have "open sesames" to the world's treasures and the curiosity to use them and should feel the uniformity of sequence in nature with joyous wonder. Premature and insincere analysis may kill all interest. They should have some vision of human history in the widest sense and every school should have an illumined chart of the most eventful milestones, creations as well as conquests, discoveries as well as dynasties. There should be a growing awareness of the waves from Egypt and Athens, Jerusalem and Rome that have reached their town or parish and of the distant past that lives on in our midst; the very stones cry out and there is something to be got from a regional survey which world history alone cannot give. Human geography is the other eye of History. A vivid knowledge of the elementary conditions of health and happiness, psychical as well as physical, is another important item, and the school should show an ever changing, but not always open, collection of things of beauty, feathers as well as pictures! As regards brain-stretchers the best is what the teacher can teach best, now Latin, now Mathematics, now the writing of good English, now the use and the making of maps. The author anticipates certain obvious criticisms and retorts in advance in a half-humorous fashion which brings out his big and tolerant view of the world.

CORRESPONDENCE.

A Committee of the British Association sent an enquiry to the Ordnance Survey respecting sheets and quarter sheets of the 6-inch map, and we have pleasure in acceding to the request of the Committee to publish the Director General's valuable reply.

October 6th, 1923.

GENTLEMEN,—

I have had under consideration your letter of 1st October, forwarding a recommendation adopted at the Liverpool Meeting of the British Association, on the subject of the discontinuance of the issue of the six-inch map in the old quarter-sheet form.

In deciding a question of this kind, it is necessary to take various considerations into account. Among these are convenience to the public, and cost of production. The latter you will recognise is a most important point, but I admit that it would not be justifiable to adopt a cheaper method of production if thereby the interests of the public were disregarded. But is this the case? The fact that it costs less to produce one whole sheet of the 6-inch map than four quarter-sheets means that the 6-inch map can be sold at a lower price, area for area, than it was when quarter sheets were issued. Thus the price of a full 6-inch sheet is 5s, but the purchase of four quarter-sheets of the same area at 1s 6d each would cost 6s. This in itself is an advantage to the public.

Again, it has been stated that the new system compels the purchaser to buy the area of four quarter-sheets when one would serve his purpose. But those who use this argument appear to forget that with the old system of quarter-sheets it was frequently necessary to buy two or more in order to cover the area it was desired to examine.

It is unfortunately impossible to please everyone, and those who find that the area in which they are interested does not fall conveniently on one of the whole sheets will be against the change of system, while those who are more lucky will be in favour of it. No system of sheets can be equally convenient for everybody; but when the change of system was decided, the question was very carefully considered and it was decided that the balance of advantage lay with the larger sheets.

I am, Gentlemen,
Your Obedient Servant,
E. M. JACK, COLONEL,
Director General.

The General Secretaries,
British Association for the Advancement of Science.

The Golden Bough. Abridged Edition. J. G. Frazer. xiv + 756 pp, 23 x 15.5 cm, frontispiece. London: Macmillan, 1923. 21/-.

This abridgement of one of the most famous compendia of information about mankind is of great value, because it presents more connectedly and clearly than the great 12 volume work the author's main line of argument about the priesthood of Diana at Aricia. The study of this subject led the author to follow out ideas of the king-priest, the sacrifice of the divine person, and the sacramental eating of the god, ideas of evil and of the scapegoat, fire festivals, and so on, the world over, and the large work, with its endless references, omitted from the abridgement, is a mine of references for the student.

The geographer may well ponder over the argument, for it suggests ever and again the notion that, underlying all the diversities that have arisen among men in the development of their inter-relations with diverse environments, there is something fundamental which is not very dissimilar whether we study men in Central Africa, in Northern Europe, or in America. The abridgement preserves the literary grace of the large work, and represents the accomplishment of a valuable public service to the student world.

PROVISIONAL PROGRAMME OF THE SPRING MEETINGS OF THE GEOGRAPHICAL ASSOCIATION AT EXETER, APRIL 4TH TO 7TH, 1924.

All Meetings will be held in the UNIVERSITY COLLEGE, EXETER.

FRIDAY, APRIL 4TH.—Reception.
Council Meeting.

SATURDAY, APRIL 5TH.—*Morning*: Conducted visits to places of interest in and around the city.
Afternoon: Joint debate with the Education Society of the South West on "The Aims of Geography." Opened by Professor H. J. Fleure, D.Sc.
Evening: It is hoped to arrange for a lecture by Professor A. Perry Brigham, of the United States (Colgate University).

SUNDAY, APRIL 6TH.—Charabanc excursion to Grimspound Hut Circles, Dartmoor, returning via the Coast Route.

MONDAY, APRIL 7TH.—Trips to places of geographical interest in the immediate neighbourhood will be arranged to meet the desires of members.

The above programme is tentative only and subject to possible alteration in details.

IMPORTANT.—(1). It will be of the greatest assistance if all members who intend to be present at any or all of the meetings will please send a postcard as soon as possible to Mr. Stanley Lewis, B.A., Lecturer in Geography, University College, Exeter, and thus help him to get an idea of the numbers to be arranged for.

(2). Will all members who wish to have further details later, to get information about accommodation or to book for excursions, please write direct to Mr. Stanley Lewis, ENCLOSING A STAMPED ADDRESSED ENVELOPE.

(3). Railway coupon entitling members to reduced fare is enclosed.

"What is Man?" J. Arthur Thomson. pp x + 244. London: Methuen, 1923. 6/6.

This is a very valuable book from many points of view, of which some are outside the scope of this journal. Here we are concerned to give it the heartiest recommendation to every teacher of geography who is trying to think seriously about man's relations to his environment and wants to have a non-technical introduction to the "Man" aspect of the problem. The solidarity of man with the whole creation, his inheritance of social habits from pre-human ancestors, his apprenticeship for his special rôle, his social and marital organizations, his mind and its activities, are all treated with the distinction, the care and the refinement of language and of thought, which have made the famous Scottish teacher a leader of thought. The book has behind it much reading, and more thought, in biology, psychology, philosophy, politics, geography, and theology, and the references to original work are usually judicious, if short. Probably the need for brevity and simplicity made difficulties for the author as regards Galton's famous formula of ancestral heredity. In any reimpression, it would be well to redraft that page, which now only the initiated can follow. In many points the author is right up to date in his knowledge, and he is usually well ahead of most of us in his understanding. It is delightful to have this thoughtful and yet simply written little book on a subject of vivid interest, especially in these days of new discoveries, from the pen of one of the greatest teachers of our time, long skilled in the subtle interweaving of many strands of thought.

REVIEWS.

Ashanti. By Capt. R. S. Rattray, M.B.E. Oxford, Clarendon Press, 1923. pp. 348. Price, 25/- net.

In the mind of the public, Ashanti is associated with several wars, which, though not large as we have now learned to look at wars, have yet been troublesome. It was in one of these that Sir Garnet, afterwards Lord, Wolseley enhanced his reputation, already considerable, by the capture of Coomassie. It is worth while to recall these facts as an indication that our relation with the people extends over a considerable stretch of time. And yet this book, which contains the results of Capt. Rattray's first year's work as Government anthropologist, adds a quantity of new facts to our knowledge. These new facts are not merely of academic interest; they are vital to the successful administration of native affairs, and it is surprising that friction has not been more frequent. It is inevitable that any notice of Capt. Rattray's book should dwell on the incident of the Golden Stool in view of the part it has played in our relations with Ashanti. The story is too long to recite here, but we recommend it to Capt. Rattray's readers as an example of the dangers of imperfect knowledge. This most sacred emblem, which among the natives is reputed to contain the soul of Ashanti, was confused with the royal stool, the symbol of kingly authority, and was demanded from them in 1900 as a sign of submission. Yet four years before, in 1896, the Ashanti had surrendered King Prempeh without resistance rather than allow the Stool to suffer an almost certain reverse in war. When the Stool, after a disappearance lasting for twenty years, again became a cause of unrest, it was owing to Capt. Rattray's investigations that the facts were made clear, and that the Government was enabled to handle the situation successfully.

Although the episode of the Golden Stool takes a prominent place in an estimation of the importance in administration of Capt. Rattray's work, it occupies a very great amount of space in his book, which is literally full of matter of the greatest interest and significance to the student. He has worked out the system of relationship very thoroughly on the lines first indicated by the late Dr. Rivers. As is usually the case when this method is employed, it has led to some noteworthy results which throw light on questions of inheritance and relationship, such as the important classification into exogamous divisions by inheritance from both mothers and fathers respectively. Another matter of great interest investigated by Capt. Rattray is the drum language. His account of this remarkable system of communication, which is something of a mystery to those who have not heard it, is extremely lucid, and he gives a number of the messages which are transmitted by its means.

Capt. Rattray's opportunities, as compared with those of the ordinary investigator, have been exceptional, and he has to his credit several years' residence as a preparation. He has made full use of his advantages, and there are few aspects of the social and religious life of the people with which he has not dealt more or less fully. He has confined himself chiefly to social anthropology, because, in his opinion, accurate and minute studies of social and religious beliefs, rites, and customs, are the most urgent need of anthropology to-day. His fellow workers will thank him not only for the success which he himself has achieved in his own field, but also for the admirable model which his work will afford others. E.N.F.

In Witch-Bound Africa: An Account of the Primitive Kaonde Tribe and their Beliefs. By Frank H. Melland, B.A. (Oxon). London: Seeley Service. 1923. pp. 316. Price, 21/- net.

Mr. Melland's study of the Ba-Kaonde of North-West Rhodesia will take an assured position among the more valuable of recent works on the natives of Africa. It has a precision of statement and a method of setting out the facts which mark it out as the work of a writer who has been trained, or has carefully trained himself, to follow a clue to its logical conclusion whatever may be the tangle of evidence in which it has been presented to him. For this, residence among the people as a magistrate and official may be held responsible. This, no doubt, also accounts for his practical bias. Whatever may be the matter under discussion, the reader feels that the author has at the back of his mind the question of the way in which it affects the relations of the white man and the black, the governor and the governed. As an example, reference may be made to Mr. Melland's account of the complications which arise in practice from the custom of cleaning and " whitening " the widows (or widower) and releasing the spirit of the dead from them, a practice involving payments to the heir of the deceased, or, if it be a woman, to her family. The author's discussion of the arguments for and against its prohibition show a keen appreciation of the social value of the custom and the native's point of view.

The history of the Ba-Kaonde or Kaonde-speaking peoples, as it would be more correct to call them, is obscure, but they would appear to be an amalgamation of three groups, differing in custom but with a common language, who were originally an offshoot of the Ba-Luba stock. Mr. Melland presents a very detailed, but at the same time eminently readable account, of their social organisation, totemic system, and religion. They are polygamous, with matrilineal inheritance, though their polygamy is limited, to some extent, by the requirement that marriage entails residence with the bride's people for a term of years, sometimes as many as ten. Lack of social coherence, which Mr. Melland attributes to the non-recognition of primogeniture, has led to their subjection to more highly organised tribes. They have not, among themselves, recognised a paramount chief. A central feature in their religion is the belief in reincarnation. As Mr. Melland's title indicates, witch-craft looms large in their lives. His investigation of this belief is full of interest; and he quotes extensively from Miss Murray's work on European witch-craft to point to close similarities with the belief as it was held in Europe. He even goes so far as to suggest the possibility of a connection derived from pre-historic Europe—a suggestion, it may be noted, which has also been put forward by Pasteur Junod in connection with Ba-Thonga witch-craft. An interesting point arises in connection with the position of the witch-doctor. It is too little appreciated that the witch doctor is on the side of law and order. This was pointed out by Dr. Malinowski in his study of the Medicine Man in the Trobriand Islands of New Guinea. The practical importance of this is indicated by the remark of one of the Ba-Kaonde, quoted by Mr. Melland, that the administration, by suppressing witch-doctors, was encouraging witches.

From what has been said, it should be apparent that "In Witch-Bound Africa" is a thoroughly sympathetic study of an interesting people which deserves the commendation of all who hold that anthropology is not merely an academic study, but is of the greatest importance in its practical application. E.N.F.

The Dravidian Element in Indian Culture. By Gilbert Slater, M.A., D.Sc. With a Foreword by H. J. Fleure, D.Sc. London, 1924. Ernest Benn, Ltd. pp. 192. Price, 10/6. net.

Dr. Slater was lately Professor of Indian Economics in the University of Madras, and like most observers who have lived in Southern India, he has been impressed by the character of Dravidian languages and cizilization, which, without themselves affording any examples of literature or art of a great age, appear to point to an origin of considerable antiquity. As a result, he, again in good company, is prepared to argue not only that Indian culture as a whole owes more to the Dravidian than is generally estimated, but that some of the features which have hitherto been regarded as characteristic of a higher civilization introduced by the later incoming Aryans, is in reality to be attributed to those earlier races upon whom the Aryan culture was held to have been imposed. Professor Slater's view is that the Aryans were relatively barbaric invaders from the north-west, who, being provided with horses, were equipped for rapid and concerted movement, and thus overcame a people of superior wealth and culture. This would be in accordance with what we know, or can infer, of the great racial migrations at this or later periods of history. The Aryans were pastoral nomads, and on this view their contributions to Indian culture were the Sanskrit language, the custom of burning the dead, and the belief in life after death. The Sanskrit language was largely adopted by the Dravidians owing to the difficulty of communication with their conquerors through the medium of their own difficult languages, but, as has often happened in the history of the world, the culture of the conquered absorbed that of the conqueror. The nomads became agriculturists, and the deities of the invaders gave place to those of the earlier races; for, as Dr. Slater points out, Vishnu, Siva, Kali, and Krishna are non-Vedic, although the cults of Vishnu and Siva in the forms we know them may owe something to the Aryan invaders. That Krishna was a non-Aryan dark-skinned god is a tradition carefully preserved by Indian pictorial art. Even the caste system, which is sometimes taken as indubitable evidence of Aryanisation, Dr. Slater holds to be Dravidian, pointing to the fact that it is in Southern India that it has the strongest hold. The Vedas record the existence of the priest-magician among the Dravidians, but the Aryans had no similar institution. Yet the priest-magician is the most important element in Indian religion. It survives in the Brahmans, who, after suffering a temporary eclipse, became supreme as the principal division of the caste system. It is unnecesary to go further into the argument to show that Dr. Slater makes out a strong case.

In regard to the origin of Dravidian civilization, Dr. Slater holds that the group of more or less homogeneous peoples speaking the Dravidian languages—the Dravidians of his book—belong to the Mediterranean race, and entered India from the north-west, as nomad hunters. On settling down they became agriculturists, and developed their characteristic culture and the differentiating peculiarities of their physique under the influence of the Indian environment. At the same time Dr. Slater is prepared to accept Prof. Elliot Smith's theory of the introduction of Egyptian cultural influence, which he thinks may have come by sea. Dr. Fleure, however, suggests in a valuable note on "Racial Affinities and Early Cultural Contacts," that the land route through Mesopotamia must be taken into account. Dr. Slater himself mentions evidence which points in the direction of Knossos. For any early connection with Knossos it would be natural to look to the land route along which copper came from the Mediterranean, and control of which no doubt was the objective of Sargon's activities in Asia Minor. The equation of a Hittite deity with Vishnu might be held to show that the great central Asiatic trade route leading to India and beyond had its beginnings at a very early date. E.N.F.

Everyman's Library. Literary and Historical Atlas of Europe. pp. xiv + 254. 4¼in. x 6¾in. Dent. Price, 2/6 (cloth).

A new edition of this valuable reference atlas by Dr. Bartholomew has just appeared. The 1915 reprint of the 1910 (First) Edition has long been out of stock. There are 96 pages of maps in colour and 32 pages of line diagrams. The maps have been thoroughly revised, and boundaries have been corrected. The spellings of place-names follow the suggestions of the P.C.G.N. Teachers will find a complete set of these atlases most valuable, and they are advised to examine those issued for the other continents in this series. Correlations between history and geography often demand just the information given in these books. W.E.W.

An Historical Atlas of Modern Europe. By C. Grant Robertson and J. G. Bartholomew. pp. 31 + 42 pp. coloured maps, 11in. x 14in. Oxford Press. Price,

The Second Edition bears the sub-title "From 1789 to 1922" as against "1789-1914" for the first edition. The critical eight years have made it necessary to add six new maps, and Principal Robertson's masterly discussion of these very considerably strengthens an already sound introduction. The first edition is so well known that it is merely necessary to say that all the old features are retained with the exception of the statistical summary and bibliography, and each of these has been replaced by more suitable material. W.E.W.

Gran Map de los Ferro-Carriles de la Republica Argentina y paises limitrofes. Price 50 pesos. Sold at Humberto 1st No. 1737, Buenos Aires.

It would need an extended notice to call attention to all the features of this very large and intricate map. It consists of six separate sheets, and if the whole were mounted as one map, as is intended, it would measure no less than 290 cm. by 165 cm., and it would then be almost impossible to examine the microsropic details with which it abounds. Possibly an atlas issue of the same map, if within reasonable cost limits, would be still more convenient. It has been compiled for the officials of the State railways by the Land Development and Farming Branch of the National Administration, and is the work of the Cartographical Section of that Branch. The Edition is limited (Review Copy is No. 1012), and each map is checked and stamped by officials of the Cartographical Section. The whole of the land south of lat. 20 S. is included within the map. It is printed in twelve colours, with the railways distinguished between those operating and those projected, and there are also special colours both for gauge and for company control. In addition there are indications of roads of various grades, telegraphs, navigable rivers, canals, temporary rivers, sailing routes, lights and wireless stations; a considerable number of carefully-executed inset maps on a large scale show the plans of certain selected towns and cities. The types of land, e.g., reservations and parks, arable, pastoral, mixed, are all carefully distinguished; there are some 10,000 place names of settlements, and the chief ranches are identified; boundaries are sub-divided into inter-national, inter-provincial, inter-departmental, and inter-what-not, down to the minutest details. In short, it is difficult to say what else other than contour lines might have been included, and all this is set out for this great Republic as a single map on a scale of about 24 miles to the inch. It is a monumental affair, and all associated with its preparation deserve general and generous commendation. W.E.W.

Comparative Wall Atlas. The Indian Empire. Eight maps, mounted, dissected, eyeletted, in case 47/6 net. Single maps, 7/6. Edited by J. F. Unstead and E. G. R. Taylor. Philip.

This is the twelfth set of wall atlas maps to be issued by the publishers, and is the fourth of the sets covering less than a complete continent. (For an extended notice of No. 3, viz., South Africa, readers are referred to page 158, "Geographical Teacher," Summer, 1923). The "Indian Empire" set possesses several novel and valuable features. Compared with the Asia set, there is a great increase of scale: 1 in 4 millions against 1 in 12 millions. The new area is mapped on Bonne's projection, and extends from nearly 40 deg. N. lat. to the south of India, with Ceylon as an inset giving a reasonable amount of overlap; the longitude limits are slightly more than 60 deg. East to 100 deg. East, i.e., there is a generous margin in all directions which will allow of the determination of India's relations with its frontier lands. No. 1 (Relief and Communications) has a better tint system, and the unpleasing very dark layer beyond 12,000 feet has been eliminated. A new contour line of 1,800 feet has been introduced with advantage. Nos. 2 and 3 are the seasonal climate maps, though the numbers are reversed in the new issue. The isobaric interval has been halved, and the June isobars have been used instead of the July ones as previously; ocean currents are added, and the indication of the extent and distribution of the irrigated areas is most useful. The heavy blue high-rainfall tint has been replaced by a more legible purple, and the map gains much in attractiveness in consequence The Winter Conditions map is more accurate in detail, and the advantage of a larger scale has been well utilised. No. 4, Asia, is represented by Nos. 4 and 5 " Indian Empire." Instead of showing the January and July isotherms on the same chart, the corrected winter isotherms are given on No. 4 together with the actual average temperatures experienced during the month. These are shown at 16 degree intervals by a series of pleasing tints. No. 5 (but for June instead of July as previously) has the corrected isotherms and the same tint system for comparisons of actual average temperatures. These two maps are quite a new feature for an atlas of this character, and meet an oft-expressed demand by geographers. It is now necessary for teachers to use this valuable innovation in such a manner as will lead to its adoption for other series of maps. There is no vegetation map in the " Indian Empire " set. No. 6 (Political, No. 8 on Asia set) also groups sacred places under five different heads, and will be valuable for working out distributions in connection with religions. No. 7 (Density of Population) has ten tints in place of the seven for Asia, and is a much improved map. There may be some criticism of dark grey being sandwiched between a warm brown and a vivid red, but the problem of so many separate tints must have been a very difficult one. The very poorly populated areas, less than one inhabitant per square mile, are well shown, and an overprint giving the main distributions of languages will prove helpful to the serious student. No. 8 (Commercial Deevlopment, No. 6 on the Asia set) follows the excellent system inaugurated in connection with the Wall Atlas of Commercial Development of the Continents, and clearly demonstrates the suitability of the scheme for analyses of smaller areas.

It will be realised that this last-issued Wall Atlas is a very serious contribution to modern teaching material, and can be unreservedly recommended both for the classroom and for the study. W.E.W.

Map of the States of the Balkan Peninsula and Adjacent Countries. One sheet, 22in. x 30in. Stanford. Paper, 3/-; mounted and folded, 6/-; C.R.V., 10/-.

The map is on a scale slightly smaller than 40 miles to the inch, and includes the greater part of CzechoSlovakia to the North and Austria to the West. It embodies all the changes as settled by the latest Treaties, and shows the Demilitarized Zones under the Treaty of Lausanne, 1923. The map is fully coloured, abounds with place names, and has that delicacy of finish which one usually associates with Stanford's Establishment. For the student of history or of international politics its value is obvious, but the school reference atlas of the geography department also needs supplements such as this.

W.E.W.

(1) The Lea and Roding Valleys. By Annie R. Hatley. 57 pp., 4¾in. x 7in. Bacon. 1/6.

(2) The River Severn. By M. Lanchester. 72 pp., 5½in x 8½ in. Murby. 2/6.

(3) The Thames Basin. By Marie Michaelis. 140 pp., 4¾in. x 7½in. Oxford Press. 3/-.

These three recently published books are alike in that each deals with river geography and each is well produced, and, for its particular purpose, should be eminently suitable, but there the resemblance ends. No. 1 sets out the main facts in very simple language, and uses the area as material for an exposition of geographic development. There are numerous maps and illustrations, the latter in pen and brush line by the author An extended bibliography and index completes this elementary text-book. No. 2 traces the Severn from its source to its mouth, and is very much more " popular " in its form. It is much more than a guide-book, however, and the salient facts have served as pegs on which to hang nearly sixty of the author's pen and ink sketches. All of these sketches are delightfully done, and it is difficult to decide whether more praise should be given to the inspired observation which saw a particular point or the economy of line with which it was sketched. No. 3 is another text-book, and is more advanced than No. 1. The preface tells us that it is a first book in systematic geography for children. Probably there will be general agreement on this point if there is unanimity as to the definition of " systematic." It is certainly a first-rate " home-region " book, with good maps and photographic illustrations. A large amount of connected information has been crowded into a small compass, and teachers will probably appreciate the merits of the book better than very young children will do. There is no index. W.E.W.

New World Atlas. 7¼in. x 9¾in. Harrap. Price, 1/- (stiff boards).

The fact that the maps are produced by the Edinburgh Geographical Institute is a guarantee of quality. The atlas has 32 pages of coloured maps, and the majority have simplified contours and are layer-tinted on a pleasing system. There are political maps for the whole world and for most of the continents. A 12-page gazetteer index of places, with latitude and longitude affixed, makes a useful addition to what is really a cheap and, at the price ,a very good atlas for the middle standards of the elementary school.

W.E.W.

Baedeker's Handbook: Berlin and its Environs. pp. 258. 4½in. x 6½in. Baedeker, Leipzig, or T. Fisher Unwin, London. Price,

The 6th Edition of this well-known guide has been recently published. It is as well-illustrated as ever, there being no less than 30 maps and plans. Notwithstanding the numerous and excellent later-comers in the ranks of handbooks, the " little red book " still deserves its popularity. The first edition appeared in 1903, and was largely an expansion of the information given in the " Northern Germany " Handbook. There has been a considerable delay in revising the 5th edition, but the present volume embodies information up to the summer of 1923, and has several new features.

W.E.W.

Evolution of the Maps of the British Isles. By Sir Herbert Fordham. pp. 20; 6½in. x 8in. Longmans, Green and Co., for Manchester University Press. Price, 1/-.

Fordham's book on " Maps," published by the Cambridge Press and reviewed in these columns, was of such a character that any further writing by the same carto-bibliographer was assured of a hearty welcome. The present booklet is a printed copy of the address which he gave in the Whitworth Hall, Manchester, in January, 1923, in connection with the Loan Exhibition of Old Maps. The collection of old maps on that occasion was a thoroughly representative one, but the booklet is of general service, and the reader who may be interested in this new field of study will find the essentials set out in a delightful manner. The development of any one section of the subject is rendered much simpler by the hints thrown out from time to time by the writer.

W.E.W.

Elementary Exercises in Map Work. By V. C. Spary. i + 16 pp. 7¼in. x 9¾in. University of London Press. Price. 9d.

There has long been need for a book such as this. The contour line is not an easy matter to teach, and the majority of hints given proceed with the instruction at such a pace that a fairly mature mind is necessary in order that the instruction can be assimilated. One of two undesirable things usually happens, either the matter is deferred to much too late a school age or the pupil never has more than a hazy idea of the line, and while able to work out purely mechanical ideas on the subject, yet is seldom able to apply his knowledge to real map reading. Mr. Spary is to be complimented on his careful, graded, accurate approach to the problem. Systematic work can be started earlier with a book such as this in front of the pupil, and the teacher will be spared the labour of thinking out various teaching appliances, which, by their very complication, often obscure the matter and leave the subject as remote as ever from real maps.

W.E.W.

Geology of Metalliferous Deposits. R. H. Rastall. pp. xii + 508. 14 x 22 cms. Cam. Univ. Press. 21/-.

The author tries to give an account of the principles that underlie the formation of ore-deposits and of the changes those deposits subsequently undergo. This is followed by a descriptive account of ores of copper, tin, lead, zinc, iron, and many other, including the precious metals. For the first task he regrets that he had not the assistance of Mr. J. E. Spurr's (1923) book on " The Ore Magmas." The association of ores, the relation of mineral vein formation to the circulation of water in the earth's crust, the fate of mineral veins in various (hot and dry, hot and wet, and so on) climatic regions, the relations of ores to uplifts, and many other topics, are argued out with much skill. The careful reader may thus gain from the book a good idea of the factors of mineral formation and mineral distribution, and he will also find valuable facts about the origins and characters of most of the chief metalliferous deposits all over the world. In addition to a general index and an index of authors cited, there is an index of place names which should help to make the book very useful for reference wherever a course in economic geography is planned so as to include a study of mineral resources. The Erzgebirge comes in in six places, Bolivia in eight, the Malay Peninsula in five, New South Wales in eight, and so on. The discussion of lead ores in Britain is sufficiently up to date to include references to Prof. O. T. Jones' " Mining District of N. Cardiganshire and W. Montgomeryshire," the 20th volume of the series of Special Reports on the Mineral Resources of Great Britain (1922), which series should be more widely known among teachers of British geography.

American Geographical Society Research Series. Each 21 x 14 cm.

No. 10. Aids to Geographical Research. J. K. Wright. xiii + 243 pp. 1923. $3.50 ($2.50 to students and teachers).

No. 12. The Land Systems of Mexico. G. M. McBride. xiii + 250 pp, many plates and figs. 1923. $3.50.

No. 1. Geography of Central Andes. A. G. Ogilvie. xii + 240 pp and folder maps. 1922.

It is a pleasure to offer congratulations to the American Geographical Society on its enterprise in organising serious research and publishing the results in this valuable and dignified way. The series is under the editorship of Dr. W. L. G. Jeorg.

No. 10.—Dr. Wright's volume is, in a sense, introductory. It gives an account of the bibliographical tools for research, and makes its survey reasonably comprehensive. After listing government publications (American, British, and French) and year books, it goes into the question of bibliographies for allied studies and previous geographical bibliographies, bibliographies of maps and lists of geographical periodicals (18 countries), printed on one side of the page only, so the other side remains free for annotation purposes. The fact that M.M. Heawood, de Margerie, Marinelli, and Wagner all co-operated with Dr. Wright in the work, is proof of the care which has been devoted to the work. It should be available for reference wherever geographical research is thought of. If we say that under Siberia we find 10 entries of one paragraph each, at least, the student will gain some idea of the scope of the work.

No. 12. Dr. McBride's book will be welcomed by teachers, who usually find it difficult to appreciate Mexican affairs. We enjoy using the famous introduction to Prescott's story of the Conquest of Mexico, with its vivid picturing of the country and of the way up from the Gulf Coast to the Mesa Centrale. But Prescott's aim is far removed from ours, and the book now being noticed gives us just the link we need. McBride says that if we want to understand a people we should study their land system, and he is doubtless not far from the truth; we may ask the geographer of Europe whether he knows Meitzen and Fustel de Coulanges and Maitland, and glean thence the depth of his knowledge.

The book begins with a simple but detailed account of the geographical setting of Mexican life, showing that in pre-Columbian days only very small fragments of Mesa del Norte (north of lat 22 deg. 30 min.) and the escarpments could be occupied to any extent, the natives being restricted to the irrigable and cultivable basins of the Mesa Centrale, Southern Escarpment, and Mesa del Sur, and especially to the first of these. Thus, though the area of Mexico is 767,200 square miles, the amount of cultivated or cultivable land is estimated at about 47,000 square miles, and, as it is organised and used in highly wasteful fashion, one understands why, with a population of less than 20 per square mile, Mexico is faced with the problem of land-hunger. After the conquest, "encomenderos" were given land and services and the duty of keeping order and of "protecting" natives; these grants were gradually converted into heritable titles, and the estates are now called "Haciendas." They may have as many as 250,000 acres, and rarely have less than 2,500. The estate often has irrigable land, forest land, a stream for water supply, and grassland for cattle, the last, of course, a feature introduced by Europeans. The proprietor is often an absentee landlord with international connections, the villagers or peons are still much as they were in pre-conquest days, though the original Spanish proprietors have given way to "mestizos," or half-breeds, for the most part. The hacienda aims at self-sufficiency, with its accompaniments of paucity of currency and weight of mortgage. At the moment the hacienda owners and their allies, among foreign capitalists, are out of power. The very large estate seems doomed so far as the better lands are concerned; the hacienda will be reduced, ranches being carved out of it, but the new schemes will need to make sure of their irrigation systems. Some of us who have followed the criticisms of Mexico in our financial papers have at least been interested to know that the last revolution was to some extent an agrarian one. A valuable and long bibliography is given.

No. 1.—Mr. Ogilvie used a part of his sojourn in America for the preparation of a critical synthesis based on the 1/M. (La Paz Region), published in 1922 by the American Geographical Society. The general arguments, pro and con, with reference to the publication of a finished 1-M map not produced officially by the State having a predominant interest in the area covered are referred to by Mr. Hinks in the "Geographical Journal," May, 1923, and our readers are advised to read the complete article. Perhaps the best summary of the map is to say that it has set a cartographical standard which it will be almost impossible to reach for all parts of South America. He wisely says that the book is to be looked upon as purely provisional because of the imperfect state of our knowledge. Dr. Bowman tells us that analogous books on ten other sheets are in course of preparation, and it is evident that the Society means to develop the supply of good maps rapidly and comprehensively. This volume follows the sequence of Geological Structure and Land Forms, Minerals and Mines, The Ocean, Climate, Drainage and Soils, Natural Vegetation, Animal Life, Inhabitants and their Environment, Social and Religious Organisation, the problem of Tacna and Arica, Bibliography and Index. The section on the people gives many interesting notes rather than a full account, and deals both with the distribution of population and the utilisation of the soil, and folder maps in both connections are most instructive. It might be well for the Society to consider some such scheme of description, for an appendix to the volumes, as that given by Clark Wissler in his " Man and Culture "; the marriage of the two lines of study would greatly profit both.

Northumberland. A. H. Cooper and A. Herbert. viii + 238 pp, 21 x 14.5 cm. Black's Colour Books, 1923. 7/6.

This is a book of rather more than averagely entertaining talk about the county of the coast-and-border castles, illustrated by coloured pictures, which, at least as reproduced, are not of special merit. Still, they give the reader a glimpse of the glories of Bamburgh, Norham, and many another great site, glories which made a well-known and distinguished Northumbrian turn from Carcassonne with something like contempt. Few, save a Northumbrian, could put things so strongly, but students of Britain will do well to glance through this book and to see how much there is in the brave border land apart from 19th century industry and the Roman Wall. We are waiting for an intimate study of the northern villages, and are thankful for, if unsatisfied with, the picture of Norham Village Green in this book.

Historic Textile Fabrics. R. Glazier. London: Batsford. xiv + 120 pp. 25.5 x 15.5 cm., 83 photographs and 120 drawings, 4 plates in colour. 1923. 21/-.

The art of weaving is bound up with the whole story of human society and of its diversities, and though this work concerns itself more with later work, and especially with ornamentation and embroidery, it gives the student many interesting points. The origins of weaving and surmises as to its beginnings are not given in this book, which starts with evidences from ancient Egypt. Types of loom are reconstructed from ancient illustrations, the evolution of pattern is discussed with special references to natural figures, emblems, and the principle of repetition. The author discusses some reasons for the remarkable continuity of craftsmanship in China, India and Persia, with the skill that this has involved, and the splendid patterning that thence developed. This craftmanship was spread by Saracens and other merchants around the Mediterranean to influence Byzantium (10th century), Florence (especially later on), and so on. This influence persisted in Italy and Flanders almost to modern times, but Lyons evolved a naturalistic treatment of floral forms in connection with which one should note the work of the French miniaturists of earlier centuries (see French Brentano—" The Middle Ages "). These are but a few points in an interesting, richly illustrated book, that is supplemented by a useful bibliography both of reference books and (separately) of text books. Will someone supplement it by trying to set togteher the archæological evidences about weaving, on a geographical basis?

Outlines of Economic Geography. J. F Horrabin. 144 pp. 18.5 x 12.5 cm., 44 maps. London: Plebs' League, 162a, Buckingham Palace Road. 1923. 2/6.

A stimulating, unconventional little book, drawing many points from the works of Miss Semple and Mr Fairgrieve, and using them to show the growth of economic interdependence of the regions of the world. This valuable line of approach has its drawbacks in that it encourages a drift into politics, and the second part of the book tries to penetrate behind appearances into realities and to discern five " great groups," to one or other of which most parts of the world are held to be attached. Such a scheme of the world is endlessly disputable, and, as the five groups are America, the British Empire, Russia, the Far East, and the French Empire, there is reason to think that too much is made of the politics of the moment. The discussion is none the less challenging, and certainly has its value for adult readers.

One is glad to notice much less in this book than in many others that is dictated by the stupid rivalries to see, it may be, Britain or France or Germany or America first and foremost, but, on the other hand, there is much denunciation of capitalism and capitalists. We are not concerned with politics save to urge that ill-will is an obstacle to truth, and that men could surely band together for good objects instead of merely against enemies. It would greatly help truth if we could realise the humanity of Germans and Russians as well as of capitalists and proletarians!

A valuable feature which should be copied in other books is the inclusion of blank pages for supplementary notes.

Economic Geography. J. McFarlane. pp viii + 640, 22 x 15 cm, 20 maps. London: Pitman's. 2nd Edition, 1923. 10/6.

This well known work has had to be prepared for this second edition under circumstances of special difficulty due to the transition in economic affairs through which Europe is struggling so painfully at the moment. The plan of the book is that of treatment country by country, or region by region, after introductory chapters, and chapters on the continents, and for economic study this is a useful scheme, as the State is necessarily in a large measure an organization of economic factors. The European countries are revised so as to give us the reduced Germany, Czechoslovakia, Yugoslavia, Poland, and, in one chapter, Russia, Finland, and the Baltic States. This implies that in remodelling chapters the author has brought his book up to date. In many details the industrial details noted are, however, necessarily those of pre-war days. The sequence of treatment is usually that of physical features, climate, products, trade and communications, such matters as land systems and racial problems being largely left out of account. Several of the maps are of natural regions within various States. Within the sphere the author has chosen the book has been and remains a valuable one, with much information in readily accessible form that is not easy to come by elsewhere.

The Earth and the Sun. Ellsworth Huntington. pp xxv + 296, 24 x 16.5 cm. Many maps, figs., tables. Yale and Oxford Univ. Presses (Mr. Humphrey Milford), 1923. 23/-.

Like "Climatic Changes," which is really a sequel to it, but which appeared earlier (see notice in G.T., Summer, 1923), this book gives the results of a great deal of co-operative investigation, in organising which Dr. Huntington has shown special skill. Here he argues that solar disturbances are of primary importance in governing weather on earth, and that they may act electrically. As to the factors of those solar disturbances, he gives arguments for and against the idea of tidal (gravitational) influences of the planets, and especially of Jupiter and Saturn, and for and against the idea of electrical influences. The first idea helps us to understand the periodicity of solar disturbances to some extent, but not the zonal arrangement of the solar disturbances or their latitudinal migrations, and these latter seem to have marked influences on different parts of the earth. The barometric gradients over the North Atlantic, for example, are said by Huntington to respond in different and opposed ways to sunspots on the two sides of the solar equator, and one solar hemisphere shows a correlation with barometric conditions at one season, the other hemisphere at another season. Thus in addition to the long established fact that the earth's atmospheric circulation depends largely upon the ordinary solar radiation, we may have to test further the view that it is also dependent upon the sun's electronic emissions. The author is clear that these ideas need such further test, but he has at least produced a most suggestive pair of books, which mark an advance through their regional study of the surfaces of both sun and earth.

When the sun is active the contrast between areas of high and low pressure on earth is accentuated. In winter in N. America and Eurasia, cold, clear weather prevails more steadily at such periods than at others, and storms are relatively scarce in the interiors. Outside these central areas, however, storminess is above the average. After midwinter storminess at times of sunspot maxima increases. In a summer with maximum solar disturbance, however, storminess decreases below the average for most parts of U.S.A., but increases around the periphery. As autumn advances these areas of storminess spread inwards. Huntington also argues for the almost uniform decrease of rainfall along the earth's heat equator at times of great solar activity.

In this book, therefore, we have a meteorological and physical argument, the results of which are applied to the problems of climates, past and present, in "Climatic Changes," and in both books the geographical element is well to the fore.

"The Queen" Book of Travel. 1923. Compiled by M. Hornsby. pp. 535. 18.3 x 10.5 cm. Field Press, E.C.4. 4/-.

It is evident that a book containing such a mass of information as this is very difficult to keep up-to-date without a considerable increase in its very low price. This may explain, for example, the recommendation of a large hotel which was burnt down several years ago and is still in ruins. The book, in addition to brief references to thousands of towns, includes hints on touring routes and equipments; these latter are extremely helpful. Rather more than one-third of the book is devoted to the British Isles, and the remainder, chiefly, to continental (European) tourist areas, though short articles, mainly reprinted from "The Field," deal with other parts of the world. There are many interesting photographic illustrations, and the volume also contains 17 maps from various sources, the majority being by Stanford's geographical establishment. One of these, at least, reflects no credit on that establishment nor on this guide. The omission of railways in a guide is less serious than the inclusion of railways which are not even projected, e.g. to New Quay in Cardiganshire and across the *mouth* of the Dovey Estuary.

W.E.W.

Where Traditions Linger. Allan Fea. 23 x 14½ cm. 307 pp. Eveleigh Nash, 1923. 12/6.

The author's sub-title of "Rambles through remote England" is a little inaccurate geographically, for the only counties discussed are Middlesex, Berks, Hants, Wilts, Dorset and Bucks, and there are certainly other parts of England which might as justifiably be termed remote. This inexactitude of definitions is accompanied by a good deal of inaccuracy in other ways, and is not improved by the careless proof correction which has allowed several spelling errors to go uncorrected. But Mr. Fea is an enthusiast for all that belongs to the historical associations of Old England, though his traditions rarely date from much farther back than Elizabethan times. There are some very delightful photographs of old buildings in the district, and the text ambles on in a pleasantly discursive way, with here and there a touch of vivid description.

Patrolling in Papua. W. R. Humphries. 23 x 14 cm. Demy 8vo., cloth. 287 pp. + folder map. T. Fisher Unwin, 1923. 21/-.

Here is a book to fascinate adventure-loving boys, for what wilder adventure could be hoped for than to cross the wilds of Papua escorted by cannibals? But as Mr. Murray, Lieutenant Governor of Papua, tells us in his introduction, "For the ordinary Papuan, murder is not a crime as we consider it, it is sometimes a duty, sometimes a part of necessary social etiquette, sometimes a relaxation, and always a passion," so that in other respects these convicted murderers may be good citizens and faithful followers. Certainly Mr. Humphries had no reason to complain of their conduct, for they endured great hardships and faithfully carried out his wishes, and he accomplished his perilous journey "without firing a shot and without the loss of a man." This is a book to bring home to the most casual reader the thrilling romance of map-making and route opening in these far distant and little known regions, for it gives vivid descriptions of the terrible sufferings undergone in order to trace out a route across the British and formerly German territories from sea to sea. The descriptions of the scenery, climate, productions, and general life in Papua are most valuable, especially as the author has put in many little personal touches that will help the reader to get clear cut mental pictures. It is certainly a book to be put on the shelves of school and university libraries. There are numerous photographs, and the map of the territory of Papua, giving the results of the 1919 surveys, will be much appreciated. Readers of this journal should study the article by Dr. A. C. Haddon in our Spring, 1921 (No. 59) number when perusing this book.

American Museum of Natural History, New York, Handbook Series. 21 x 13.5 cm. Price of each, 75 cents + postage, obtainable from the Librarian, Amer. Mus. Nat. Hist., New York, U.S.A.

No. 1. Indians of the Plains. pp 163. 1920 (2nd edition).

No. 2. Indians of the South-West. pp 195. 1921 (2nd edition).

No. 3. Ancient Civilizations. Mexico and Central America. pp 242 (2nd edition, revised).

No. 8. Peoples of the Philippines. pp 224. 1919.

This richly illustrated series of handbooks will be welcomed by many students, and should be of special value to teachers who want to understand the native life of parts of the New World. "The Indians of the Plains" (by Clark Wissler) gives useful maps of N. American culture areas, with the limits of the buffalo in 1800, the locations of the plains tribes, and of the distribution of the forests in the Western United States before European interference altered it. The material culture of the tribes, with much information about their hunting weapons and methods, is described and illustrated, while both their tipi (tents) and the villages developed towards the eastern (forested) border of the plains are discussed. Villagers are said to make pottery in many cases. Social Organization, Religion, Art, Language and Physical Race Characters all get chapters, and the book concludes with a chronological survey in the period 1540—1880 is distinguished from the pre-Columbian period as a horse culture period. The similarities among the plains folk are on the whole ascribed to diffusion of culture rather than to parallelism of evolution.

"The Indians of the South West" (by P. E. Goddard) gives maps corresponding to those above mentioned, but devotes chapters to separate accounts of the Ancient Peoples, the Pueblo Dwellers, the Village Dwellers, and the Cam Dwellers. The ancient peoples built large community houses, irrigated the land, and grew corn and beans and perhaps cotton, and made highly decorated pottery, but were apparently unable to work metal. Their domestic animal was the turkey. The Pueblo scheme is a community house sometimes built around a court, often made out of adobe brick, but sometimes the arrangement is along a street. The "Village" scheme here, on the other hand, is one of a series of houses each for one family.

"The Ancient Civilizations of Mexico and Central America" (by H. J. Spinden) will be found invaluable as an introduction to Maudslay's "Guatemala." It gives most interesting maps of the range of the old high-grade civilizations and their influences, as well as a map of the distributions of the various types of native agriculture in the New World. One regrets that the book contains, so far as the reviewer could see, no reference to the views of Elliott Smith, who thinks the ancient civilizations of the New World owed something to direct contributions from the Old (see the "Migrations of Culture"). The good geographer will have read his Prescott, and this handbook will help to enrich his picture of this region with its strangely isolated culture.

"The Peoples of the Philippines" (A. L. Kroeber) gives an introduction to the study of the E. Indian Archipelago, followed by a treatment of the Philippines under the same general scheme as that used for the Plains Indians in Vol. I of the Series. The maps which bring out the relations of peoples,—Negritoes, Indonesians, Malays—to the features of the region are very valuable, and the details of cultivation, stock keeping, houses, and so on, are very clearly argued.

The names of the authors indicate a general high standard for the guides, and the value of each is enhanced by the selected bibliography included at the end of it.

Early Civilization. A. A. Goldenweiser. pp xiv + 428 x figs. 58. Harraps. 1923. 15/-.

The author sums up here the results of a wide and varied reading, and parts of the book will be found of considerable value to geographers, though other sections rather invite criticism. In a few sections the author obviously writes without having read important relevant matter as in the references to the custom of eating the bodies of dead relatives, but Mr. Hutton has dealt with this at some length in "Folklore" for October, 1923, and we need not repeat the notes he makes. From the geographer's point of view the most valuable sections are those which give accounts of the Eskimo, the Tlingit and Haida Indians of N.W. America, the Iroquois matriarchate, the people of Uganda, and the people of Central Australia. Each of these groups is used again and again for illustration, and by setting the various references together one gains quite a lot of information about the people's life. The author is wisely anxious to show that we have to look upon the environment as offering opportunities and difficulties to men; they may take or leave the opportunities, overcome or suffer the disabilities. A characteristic feature of the Indians of N.W. British Columbia is their extensive utilization of wood, but though there is abundant timber in California, there are tribes who do not take advantage of it. Goldenweiser also tries to strike a balance between those who claim that similarities between peoples distant from one another are due to parallel or convergent evolution and those who think such similarities usually imply diffusion of culture from a common centre. Obviously both explanations have their place, and it is a little unfortunate that hot blood has arisen on this question, largely because the diffusionists have suggested an Old World origin for some features of the complex Toltec, Aztec, Maya, Inca civilizations. A calm if hostile criticism of some of the stronger points of those who are diffusionists in this matter would be very welcome, but Dr. Goldenweiser gets rather excited at this point. In a final section the theories of Spencer, Fraser, Wundt, Durkheim, Lévy Bruhl, and Freud, are all critically summarised, and attention is paid to the influence of European contacts on many aboriginal groups.

Shropshire Place Names. E. W. Bowcock. pp 271, 18.5 x 13 cm. Shrewsbury: Wilding, Castle Street, 1923. 8/6.

This book is one of the early fruits of the scheme so well worked out by Professor Allen Mawer in the columns of this magazine and elsewhere. He deserves hearty congratulations from all who know the difficulties of co-operative research and from those who know of what mutual assistance the philological expert and the local specialist can be to one another if they can be brought together. This is just what Prof. Mawer has achieved, and we think he is thus advancing the study of place names in a remarkable way. To know Shropshire is to love one of the most beautiful of the counties of England, and a county at the same time unusually rich in historic towns and monuments of wide interest. Ludlow, Stokesay, Clun, Wentnor, Wenlock, Bridgnorth, Shrewsbury, all call up visions of the glories of our country, and Salopian readers will all have something to add to this too-short list.

For each place names are given as found in various documents from Domesday onwards, and the various forms and their etymology are then discussed in a paragraph for each place. Shrawardine was Saleurdine in Domesday, and the frequent termination "Wardine" means a farm. Shrewsbury (Scrob beorg) has the form Searobyrig corrupted into Searesbyrig. Salop comes through change of r into Anglo-Norman l. Of the many Shropshire names ending in "ington," it would appear that not one that is mentioned in Domesday had the syllable "ing" or any probable equivalent of it.

It would be very interesting to have map studies of distributions of various prefixes and suffixes in place names.

Towns and Town Planning. T. H. Hughes and E. A. G. Lamborn. Oxford at the Clarendon Press, 1923. 156 pp x cm. 89 illustrations. 15/-.

This sketch of the history of town planning strikes its keynote in the first paragraph. " A very little study of ancient cities proves that the art of planning cities as harmonious wholes was studied and to some extent practised in every age until it was swept away with all other lovely things in that great outburst of materialism we call the industrial revolution. The authors acknowledge their debt to Professor Tout's book on " Mediæval Town Planning " and to the articles by Sir W. St. John Hope and Dr. Page in " Archæologia." Behind these they have sought material in Prof. Haverfield's " Ancient Town Planning," and behind him again they have drawn upon the work of the German excavators at Priene and the Egyptian work of Sir W. M. Flinders Petrie. They also acknowledge the great help of Mr. J. de M. Johnson of the Clarendon Press, help which is widely bestowed. The linking of antiquity, the middle ages, the renaissance, the eighteenth century, and the modern efforts to plan harmonious wholes into one book, abundantly justifies the production of the work, and all through we follow with interest and some concern the attachment of the city builder to the gridiron plan and his hesitation to adapt himself to geographical factors. Men see, and make, what their minds instruct them to see and to make, and the reasonable observation of relations between man and environment is one of the most difficult of all subjects either to expound or to investigate, probably because it is too complex to allow us to make sweeping generalisations that would capture our minds.

The student who may look for comparisons and interpretations of the features of unplanned cities in different regions will not have his curiosity gratified in this book, nor will he find very much of value about that picturesque creation the English village, but he will nevertheless gather fragments which may help him to understand the villages and towns of his region. Chichester, Aylesbury, Norwich, Shrewsbury, Radnor, Flint, Edinburgh, Ludlow, St. Albans, Oxford, Witney, Hertford, Buckingham, Lynn, Southampton, Portsmouth, Newport (I.W.), Salisbury, Carnarvon, Conway, Hull, Winchelsea, Londonderry, London, and Bath, are a few among the many of our towns that receive illustration or comment of a suggestive kind in this book.

The last section surveys Washington, Letchworth, Bournville, Cardiff, Delhi, Canberra, Dundee extensions, the Lickey Hills scheme, and provides much food for thought among teachers of geography, who see and seize their opportunity to work for the betterment of the districts in which they work.

The authors speak of some buildings as being as uninspiring as workhouses or elementary schools. We regretfully admit a large, though we hope a diminishing, measure of truth in the complaint about the schools. May we not hope that teachers who study their districts with a view to their amelioration will have the courage to reveal to the public that the schools are the greatest of all the public services, and that towards this end they will come forward with plans that will make the schools more adequate to their great purpose.

Bermuda Past and Present. W. B. Hayward. pp 242, 19.5 x 12.5 cm. Stanley Paul, 1923. 8/6.

The first seven chapters follow the story of the island group from their discovery to the American Civil War with its ghastly associations for the Bermudas. The next chapter is a short survey of their geographical features, including an account of the remarkably soft building stone (matrix of broken shells) which hardens on exposure and acquires almost a polish; the house-builders who evolved the Bermudan style were shipwrights and brought in ideas previously applied to ships. Also it is said that nearly every garden has a tree or shrub that somebody's grandfather brought from the West Indies, the Mediterranean, or Brazil. The literary associations of the islands are treated at some length, and there follow sections on the parishes, the sports and recreations, the government, and the resources of the islands.

Economic Geography of Indiana. S. S. Visher. 225 pp, 19.5 x 12.5 cm., double page map and 105 figs. New York: Appleton and Co., 1923.

Readers of Mr. Visher's articles in this magazine will be prepared for a valuable study of this important State, and its general plan should be studied by those who are concerned to devise good local geographies, though many adjustments would need to be made to adapt that plan to regions with long continuous history on this side the ocean. The sequence is Location, Topography, Soil, Forests, Population, Mineral Wealth, Climate, Transportation, Agriculture, Extractive and Manufacturing Industries, Cities and Commerce. A characteristic of the whole book is the inclusion of large numbers of small maps giving variations within the State in all sorts of matters. Many points rarely if ever brought into studies of European districts are worked out here, and the book has a value for students of geography other than those whose immediate need is information about Indiana.

Pictorial Aids to Geography. We have received from Messrs. A. and C. Black a paper-covered selection of 20 pictures illustrative of the geography of the Rhine, size 8½ x 5½ ins., price 6d. Teachers of geography should certainly get Messrs. Black's catalogues of geographical illustrations. A further volume in their "Pictorial Geographies," of which the special feature is coloured illustrations alternating with each page of print, is also to hand, "Africa in Pictures," 9¾in. x 7¼in," price, 3/6.

West of England Tin Mining. W. S. Lewis. 42 pp., 21 x 14 cm. Exeter: Wheaton, 1923.

Mr. Lewis tries to link up the scattered details of the British tin trade, a worthy object at a time when Cornwall is suffering such distress. Mr. Lewis is geologically trained, and gives a serious account from this side with a great deal of documentation. Then he proceeds to discuss the industry from its dim and dubious prehistoric origins. Where possible he gives statistics, and his bibliography is continuously extensive. He tries to estimate the uses of the tin at the various periods, the development of mining as a partial substitute for the earlier phase of surface working. Tables are given of the former smelting centres in the two countries, with the remains that give evidence of their existence. The appendices include a table of official returns of tin production, with a warning note that a great deal went as contraband in former times, a list of official geological maps, and a useful bibliography. It seems that this pamphlet is a very useful piece of work carried out with the varied reading and citation that our readers are learning to think of as a feature of Mr. Lewis' work.

Travels in Arabia Deserta. C. M. Doughty. New and cheaper unabridged edition. Two vols, 23 x 15 cms, many figs in text, frontispiece portraits of author. Vol. 1, pp xxvi + 623 + pl. 7 + pocket with maps. Vol. 2, pp xiv + 690. London: Jonathan Cape and the Medici Society, 1923. £3 3s.

Wanderings in Arabia. Abridged from the above. Reprinted by Duckworth, London. Vol. 1, pp xii + 309. Vol. 2 pp x + 297 + folder map. 1923. 20/-.

This is no occasion for a review of the usual type, but rather an opportunity to add one more to the many tributes of unreserved admiration for that book of our time which seems destined above most or all others to take a great and permanent place in the world's literature, both as an artistic creation and as a scientific document that cannot well grow old. We would first express our thanks to the eminent author and to the publishers for the public service these new issues represent, and we hope that the book may be spread far and wide to every school and college library. It is specially important that this unique document should be available to the browsing student or pupil who is trying to understand either geography or world history, or the Scriptures, or the world's religions, or international politics, while anyone interested in natural history, including geology, or in archæology, will find here much that will repay careful thought. Our purpose must be to make known the work if possible more widely among teachers and students, and this cannot be better attempted than by giving parts of Mr. Doughty's preface to the previous edition.

"Having spent the best part of ten years of early manhood sojourning in succession in most of the Continental countries, and lastly in Syria, and having wandered through the length and breadth of Palestine, I reached Egypt and Sinai; where with Beduin guides, I wandered on, through the most of that vast mountainous labyrinthine solitude of rainless valleys; with their sand-wind burnished rocks and stones, and on some of them often strangely scribbled Nabatæan cliff-inscriptions (the names, the saws and salutations of ancient wayfarers). From thence gone up to Edom, I visited Petra; and . . . . heard of other cliff monuments at Medáin Sâlih . . . . Finding none other means, I had taken the adventure of journeying thither in the great Damascus caravan . . . . The monuments . . . proved to be Nabatæan from . . . the beginning of our era. The pilgrims come again, I did not return with them to Syria, but rode with a friendly sheykh . . . to live with . . . the Beduins . . . awhile in the high desert . . . .

In the adventure thus begun, there passed over me, amongst the thinly scattered, generally hostile and suspicious inhabitants of that land of wilderness, nearly two long and partly weary years."

The preface to the first edition (1888) may also be quoted. "The book is not milk for babes: it might be likened to a mirror, wherein is set forth faithfully some parcel of the soil of Arabia smelling of samn and camels."

And so, in his own finely chiselled phrases, we have the description of the two great aspects of Mr. Doughty's book. It needs but a light effort of imagination to realise something of the magnitude and the wonder of the author's adventure in joining his brethren of the desert in their black tents for two years that he might learn to understand them and their forefathers, whose story is in our Bibles. We have but to contrast this enterprise, carried through by one man without disguise or dissembling, with many other schemes of exploration, to realise one of the factors of this book's importance. It is an intimate personal document telling of the nomad life as it really is. The courage that carried through this plan was accompanied by a power to picture the desert of high Arabia in words that vibrate in the memory, and an insight to observe the true relations of men and things in the starry wilderness. Zeyd and his wife Hirfa become, as we read, live figures that have their place beside Tess and Piers Plowman, and many another child of literature.

We may close the attempt to convey an impression of this book to those who as yet know it not, by a quotation which tells of Mr. Doughty's love for Arabia.

" Pleasant, as the fiery heat of the desert daylight is done, is our homely evening fire. The sun gone down upon a highland steppe of Arabia, whose common altitude is above 3,000 feet, the thin dry air is presently refreshed, the sand is soon cold; wherein yet at three fingers' depth is left a sunny warmth of the past day's heat until the new sunrise. After a half-hour it is the blue night, and clear hoary starlight, in which there shines the girdle of the milky way, with a marvellous clarity."

It may help students to know that the abridgement does not alter the text. There are many omissions of paragraphs and of pages (all faithfully indicated), while some long sections also are left out. Among these are the account of Moab and of Petra and a great deal about the Haj, part of the story of the Medáin Sâlih journey, the descriptions of wandering on the Harra sandstone tablelands covered by basalt on the west border of N. Arabia, between Tebûk and Mecca, and 5,000 feet over sea level, and of the descent to summer camps with the visit to Teyma, the date harvest, and much more. The accounts of Hâyil and of Kheybar and of the life there are also much cut.

The unabridged edition has many illustrations and an invaluable 150 page index and glossary of Arabic words. As the matter per page is not very different in the two books a rough measure of the omissions in the abridgement may be made.

An Introduction to Stratigraphy (British Isles). By L. Dudley Stamp, D.Sc. 368 pp. 19 x 12.5 cms. Thomas Murby and Co., 1923. 10/-.

Like all other sciences, that of Stratigraphical Geology has grown by a method of induction. The work of geological research has produced a collection of descriptions, in many cases very detailed, of the rocks found in nearly all the accessible regions of the earth, from which, by the application of Lyellian principles, and by comparing and contrasting one area with another, conceptions of the geographical conditions of the various geological periods have been reached. This process has been a very laborious one, and, as Dr. Dudley Stamp points out in the preface to this book, there is " no reason why the elementary student should be dragged over the same thorny path." In earlier books of stratigraphy, and in most of our Universities and colleges, the treatment of the subject has been along these lines, but the writer of this book reverses the method, giving first an account of the geographical conditions of each geological period, and follows each account with a detailed description of the rocks of that period. This is undoubtedly the most logical method of treating the subject, for our knowledge at present is such that we can estimate, with a fair degree of accuracy, the position of coast-lines or the physical conditions of any period.

All students of stratigraphy will find this book of very great use to them. They will no longer have to form their own conception of palæogeographical conditions, but, with these conditions as a starting point, will be able to anticipate not only the types of rocks to be found in any area, but their thickness, faunal characteristics, or even their mineralogical composition.

The book has many other points to recommend it. It contains a very large number of maps, diagrams and sections, many of which are original, whilst others are taken from the published works of other authors. These will be of great help toward the formation in the student's mind of a clear conception of the conditions of deposition of the various rock groups. Chapters I, II and III of the book, in which, among other things, the writer deals briefly with the relationship between earth movement and igneous activity, with stratigraphical palæontology and with the morphology of the British Isles, form a valuable introduction to any book on stratigraphy. The writer moreover makes the book of use to the students of economic geology by the addition of short concise accounts of the igneous rocks and of the economic products of each period.

Several corrections have apparently been made in the text whilst in print, but there are still other points which need correcting, and these will undoubtedly be remedied in a later edition. The writer is to be commended on his presentation, in a very readable form, of a very difficult subject, and it is to be hoped that the book will go through many editions.

John I. Platt.

UNIVERSITY OF OXFORD, SCHOOL OF GEOGRAPHY.

VACATION COURSE, 1924.

THE TWELFTH BIENNIAL VACATION COURSE at the Oxford School of Geography will be held this year from TUESDAY, AUGUST 5TH TO FRIDAY, AUGUST 22ND, under the direction of the Reader (Mr. H. O. Beckit), assisted by the Staff and other members of the School, and specially invited lecturers.

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Full particulars of courses, fees and regulations will be supplied on application to the College.

London on the Thames. H. Ormsby. pp. xiv + 189, 22.5 x 14.5 cm., 34 figs. London: Sifton Praed, 1924. 7/6.

Mrs. Ormsby has worked patiently at the reconstruction of the fundamental topography of London and in this book she gives us a short and clear commentary on the maps which have grown from her work. London is so sacred to the memory of the efforts and struggles of many British generations that her old streets all mean much to us when we hear them mentioned as matters of orography in these fascinating pages. Stripping off the pollutions (e.g., of the river) as well as the embellishments of the industrial age, Mrs. Ormsby uses Pepys and others to give an insight into her maps, and she thence shows us how London grew apace when the lands of the religious orders no longer interposed barriers. Behind that she reveals to us the lines of mediæval London, with the juxtaposition of abbey and slum arising from the "right of sanctuary," which drew criminals as well as unfortunates to the sacred precincts. The Hanse, following Florentines and Lombards, obviously used London as an entrepôt as well as for the gathering of the wool, hides, tallow, and other raw products that backward Britain produced, and one glimpses something of actualities at times slurred over in our books when one reads that Edward I granted the Italians the customs from wool, wool fills and hides to Brancho of Florence to liquidate his debts. In the list of payments London heads the list, and is followed by Boston and Hull. Southampton and Newcastle follow a long way behind, while Ipswich, King's Lynn, Yarmouth and Sandwich are the next group. Herrings, wine, iron, clay and potters' earth, flax, beasts, were items of entrepôt trade at the time, and one gets an idea of the glories of the river from the statement by Howell that "Thames-water beer bears the price of wine in many places beyond the seas, and the Portugalls have found of late such virtues in that water that they carry it away by whole tuns to Lisbon." Behind, again, the mediæval city, Mrs. Ormsby gives us an idea of the scene in Saxon times, and behind that again we have the beginnings of London laid bare, as she sees the problem, in a way that arrests the attention.

Without going further back in the archæological record, Mrs. Ormsby suggests Belgae crossing over to Essex (Camulodonum) and Middlesex and finding the more open woodlands of the Chiltern slopes (Verulam) better pasturage for hogs and cattle than the denser woods of the London clay. Then she takes up the suggestion made by Sir Halford Mackinder that a site near London became a port of Verulam. The Romans, needing to cross the Thames to get to Verulam, made their road use a ford at Westminster, concerning which Mrs Ormsby has several useful reflections. But that site was very inferior to one near the deep water harbours in the estuaries of the tributaries farther east when a bridge was needed; and London City began to grow at its rival's expense. A way grew up along the edge of the higher land going westward from the hillocks of London to join the first Roman road at what is now Marble Arch. Thus began what later became the road to Oxford, and is now Oxford Street, whence we may turn south into, let us say, Bond Street, that lies across the valley of the Tyburn. The contours for the city area are taken at intervals of five feet, and there are endless little points that the London teacher will find it useful to work out from them. Mrs. Ormsby has found herself unable to decide the natural topography and drainage of the region just north of the Tower, failing excavations to clear up some difficulties. There may have been a separate tributary here, or Tower Hill, etc., may be partly artificial, and the natural drainage may have been to the Walbrook. Fig. xv will give special joy to the teacher with its demonstration of the utilisation of the upper part of a downward slope for the line of the wall and the placing of Aldgate and Bishopsgate, especially at points where small ridges projected outwards so as to be useful for roads.

We have a feeling that the last word has by no means been said about origins of London, and look forward to efforts to map accurately all finds and evidences connected with pre-Roman life in the area. Nevertheless we believe that Mrs. Ormsby's view is as good a one as present evidence permits.

Most of our readers will agree that to publish a book of a new kind about London is an achievement, and we only hope that subsequent checking of the data may substantiate Mrs. Ormsby's conclusions and establish her book as one of the lasting contributions to the understanding of the city of the river mouths. Her effort is one which calls for the grateful thanks of geographers, and it gives her a serious claim to a place in our front ranks.

Trade and Industry of Finland. 32.4 x 24.6 cm. 732 pp. + index. J. Simelius Heirs. Helsingfors. Translated into English by Mrs. Mary Stenbäck. £5.

This huge volume consists of a useful general introduction giving the main outlines of the geography and trade of the country, followed by descriptions of individual business firms in Finland. There is a map showing the general world relations of Finland, and also the way in which the 0°C. Isotherm affects it, and another detailed map of Finland itself, giving frontiers, canals, roads, towns, railways, steamer routes, and also railways planned but not yet carried out. The difficulty of working from a book arranged under headings of firms, and not classified according either to region or products, is lessened by the fact that an index of imported and an index of exported goods is given.

Bulletin Imperial Geological Survey Tokio, 1922. Vol. 26. No. 1.
History of the Imperial Geological Survey Tokio, 1923.

These two pamphlets emanate from the active school of Japanese geologists, and the latter tells of the start made in 1878 by T. Wada and Prof. Naumann. Maps 1/400000, 1/200000, 1/1000000, were to be issued, and many were completed. Some maps 1/75000, 1/7500, 1/25000 have been made. The divisions include Geology, Topography, Chemistry, Minerals, Oil Lands, and so on, and the pamphlet gives a list of the Survey publications. The Bulletin gives accounts (in Japanese) of the Kuno and some other mines.

A Graded Course of Geography. Book III. Third year. Pt. 1, North America. E. S. Price. 9¾in. x 7½in. Philip. 1/9.

The many teachers who have written to the Geographical Association's office for information as to text books on North America will welcome this addition to Mr. Price's important series. As has been pointed out in reviews of earlier parts of the series, the book bears throughout the evidence of the practical teacher's mind, and has the advantage of having been put into practice before it was written.

Citizenship and the School. P. B. Showan. 20.5 x 13.5 cm. Camb. Univ. Press. 7/6.

This book should prove of interest to teachers of history and of geography even though there may be no special civics course in the school, for it is always useful to be reminded of the fundamentals of civilisation in which our subjects have their roots. History is treated much more fully than geography, though there is a chapter on Some Economic Aspects of School Geography. The history syllabus seems to us to suffer considerably from lack of a preliminary study of the setting of the stage in Greece.

The First Days of Man. F. A. Kummer. 20.5 x 13.5 cm. Hodder and Stoughton. 7/6.

This little book is an attempt to put concretely and in individual manner the story of the evolution of civilisation. There are stories of the first boat, the first bow and arrow, the coming of fire, the first spear, and so on. As an introduction to evolution this sort of thing is a little dangerous, for none of man's inventions seems to have come suddenly as the outcome of one man's thought. They have all been perfected by a slow process of cumulative improvements of trifles. It is also unfortunate to suggest that even before man existed nature was considering how to make the earth fit for him; surely this is a piece of unwarranted race egoism. Having suggested that these points should be borne in mind when the book is used, we would add that the stories in it, and the illustrations, are certain to stimulate children's interest and curiosity, even possibly to arouse their critical instincts.

The Happy Traveller. F. Tatchell. 19.5 x 12.5 cm. 264 pp. + index. Methuen. 7/6.

This is a book to make one long to be a youth again with all the world an oyster. Its dedication "To Young Adventurers of the Future in the hope that they may have as much Fun out of Travelling as I have had," is typical of the fresh spirit of the book. If you are young and poor and want to travel, read this book, and if you are only able to take your travels in fancy along with your pupils from the classroom, then also read the book to get the little touches of reality that make such classroom travels real. There is a section on the art of travelling, a section describing the author's experiences in the Mediterranean lands (France, Italy, Spain, Portugal, Malta, Rumania, Greece, Egypt and Russia, each get a chapter), one on the Far East (a chapter each for the Voyage Out, Across Canada, Japan, China, India and Ceylon, The Malay States, E. Indies, Burma), and one on Islands (a chapter each for South Sea Islands, New Zealand, Tropical Australia, New South Wales, Tasmania, W. Indies, Cuba, the Seychelles).

United States Year Book of Agriculture, 1921 and 1922.

These two books, which are mines of up-to-date information, have been added to the Association Library, and we feel sure that students and teachers will much appreciate the possibility of using them. The main chapter in the 1921 book are a summary of the year in agriculture, wheat production and marketing, the corn crop, beef supply, cotton situation, and a graphic summary of American agriculture. The 1922 book contains a summary of the year in agriculture, timber, mine or crop, hog production and marketing, the dairy industry, history and status of tobacco culture, and a chapter on oats, barley, rye, rice, sorghum, and flax. In addition, each volume contains an appendix giving statistics of crops, live stock, agricultural imports and exports, cost data, etc. The books are well illustrated, having photos, production maps on the dot system, and numerous graphs and diagrams.

Man and Culture. Clark Wissler. Pp xi + 371, 20.5 x 14.5 cm, 17 text figs. New York: Crowell Company, 1923.

Whereas Goldenweiser's recent and valuable book on Early Civilizations gives us in effect a fairly comprehensive survey of five samples of human culture—the Central Eskimo, the Tlingit and Haida of N.W. America, the Iroquois Matriarchate, Uganda and the Central Australians, Wissler follows a much more generalised line of work though he quotes from all manner of cultures, and makes us feel very clearly the feebleness of the accepted division between "savage" and civilized.

He shows us that the horse culture taken by Spaniards to America spread quickly with many attendant details to Indians who had never seen a Spaniard, and was inherited from them by cowboys of the western plains of U.S.A., who thus have many Spanish details in their equipment through one of the strangest of all sequences of inheritance. Whereas the horse thus brought a culture-complex with him from Europe, the maize plant shows us quite other sequences of influence. Wissler finds its cultivation accompanied by one and the same series of accessories among the prehistoric peoples of the whole south-east of the United States, and many of these accessories have been taken over detail for detail by those European settlers who have made it their food plant. Maize has, however, also been introduced into Europe, and there the cultivator has developed a system of cultivation for it based upon his European traditions. Here, therefore, we have strong evidences of influence of environment, a principle always marked among cultivators, for have not France, Egypt, China, absorbed wave after wave of invaders, and taught each in turn the ways of the land?

Wissler sketches many suggestive distributional studies, and a lot of his hints will be of value to geographers. At the centre the culture complex is at its fullest, and one may trace the spread of its individual elements becoming less and less numerous and definite as we get farther from the centre; the culminating traits, in his opinion, are apt not to spread at all.

The book is full of suggestions on all sort of problems affecting the broader aspects of geography, and will be found profitable for reading by teachers and senior pupils if they are at all drawn towards thought about relations between mind and environment.

A Naturalist at the Poles. The Life, Work and Voyages of Dr. W. S. Bruce. R. N. Rudmose Brown. pp. 316 x , 38 illust. and 3 maps. London: Seeley Service, 1923. 25/-.

Dr. Rudmose Brown, for years the helper and confidant of Dr. Bruce, was as obviously indicated as the writer of this life, as it was obviously indicated that a life of so distinguished a scientist was needed. For Bruce was not only an explorer, he was, and was first and foremost, a man of science applying scientific ideas in the field of exploration around the poles. His was a voice not heard in the street, and he sacrificed the public fame that has come to many another man who has advanced knowledge less, yet that he was no narrow daysman may be inferred from the fact that he gathered round Patrick Geddes in old Edinburgh Days, and Rudmose Brown manages to put in a tribute to "P.G." that will please even his "extraordinary followers of every nationality," to quote our author. One is interested to gather that even then Bruce was apt to stand aside and to deceive people into thinking he was not born to lead. His biographer admires his modesty and devotion to science with very legitimate regrets that he did not advertise a little more and so obtain the funds to make his work as full as it might be. That Bruce was very poorly treated by Governmental and other persons in London is well known, and the fact that the war cut across his plans for developing his research schemes into an Oceanographical Institute in Edinburgh is another matter for regret. It will be gathered that Bruce and his work were unsensational, but whether we be geomorphologists or cartographers, naturalists or meteorologists, our debt to Bruce is a deep one for much patient sounding and mapping and collecting, as well as for endless streams of wise thought that went into many men's work, including that of his biographer, who acknowledges his chief's help with warm generosity.

Bruce began as a doctor and naturalist in an Antarctic party in 1892, and Mr. Mill included him in an 1896 voyage, but his greatest effort was the Scotia Antarctic Expedition, a Scottish national effort, in 1902. Here he was leader, and insisted on concentration on scientific work, as Rudmose Brown, who was with him as naturalist, indicates repeatedly. The discovery of Coats Land is the best known of their results, but mapping of the sea floor played a greater part in the scheme, and to its value we have high testimony in that the Prince of Monaco selected the name of the Scotia for inscription on the walls of his great Oceanographical Institute at Monaco in the little company of ships that have done great service to the science of the sea.

The English in Guiana, 1604—1668. J. A. Williamson. pp 192, 23 x 15.5 cm. Oxford, at the Clarendon Press. 1923. 12/6.

In this book the well known author deals with the political background of British efforts in Guiana in the 17th century, the penetration up Amazon and Orinoco, the Amazon Company, the Guiana Company, and finally Surinam. All this is a little known part of our story, and the author furnishes a guide to the authorities on the region in the course of his very clear narrative. We learn of British attempts to settle on the Amazons for cultivation and trade, of the conflicts with Portuguese settled at Para, of the remarkable success of the British foundation of Surinam (1651) by men who had gained the necessary experience in Barbados. During the Commonwealth the colony attracted Royalists, who were in high favour at the Restoration, and then came the vicissitudes of war and the cession of Surinam to the Dutch, its present holders. There had been Dutch-Jews in an earlier colony, the people of which had been massacred by Caribs in 1645, and when Willoughby's men arrived in 1651 they found one white man, Jacob Enoch, who may have been a survivor of this group. Jews came from 1652 onwards, and also settled at Cayenne, between its abandonment by the French about that time and its reoccupation in 1664, when the Jewish families at Cayenne moved to Surinam. The Jewish colony has survived from that time onwards, and its records are a valued source of information. What is now British Guiana first came (temporarily) into British possession in 1781, so that area does not figure to any extent in the book under review, but some of its vicissitudes in the seventeenth century are mentioned; it has been definitely British since 1815.

World Geography and World Problems. "Citizen of the World" Geographies, Vol. III. J. F. Unstead. pp. viii + 280, 19 x 12.5 cm., 22 diagrams and diagram maps. London: Sedgwick and Jackson Ltd., 1923. 4/-.

This is a book for classes working towards Matriculation, and is the third member of a series of four which Professor Unstead has undertaken. It follows the same lines as the first two books, and deals with the continents seriatim, with the exception of Europe, which was in the second book. Thereafter, world climates and natural regions are reviewed in 50 pages, and notes on some problems, especially of political relations, are added. A good deal of space is devoted to questions. It need not be said that Prof. Unstead's way of putting things is determined by a wish to avoid all nationalist prejudiecs. May one express the hope that, in future editions, Prof. Unstead may find it possible to give references at the end of each chapter to the important sources of information, so that schools may acquire them for their bookshelves and pupils may learn to use them. It is this above all things that is needed if geography is to have its proper place in education for world-citizenship.

The Edge of the Desert. Ianthe Dunbar. 26 x 19 cm. 148 pp. Philip Allan. 12/6.

There is great need for books giving an account of the life in the lands between the Sahara and the Mediterranean from first hand contact, so Miss Dunbar's is very welcome. It gives descriptions of Kairouan, Sfax, Sousse, oasis towns such as Gafsa and Tozeur, Gabes and Tunis. Although the book is written in an exceedingly simple style, it gives a great deal of valuable information as to the resources and trade of the region, and, of course, the insight the author gained into the customs and daily life of the people is of the greatest use to the geographer. The impressionist black and white sketches, with occasional dabs of blue sky as the only touch of colour, are at any rate original, though whether they appeal to readers will depend very much on individual taste; there is no map, nor are there any photos.

Across the Great Crater Land to the Congo. T. A. Barns. 24 x 14.5 cm. 269 pp. + appendices. Benn, 1923. 25/-.

This book is a sequel to "The Wonderland of the Eastern Congo." It contains 82 illustrations and has two folder maps, one showing the plateau of the craters and the other a map of the author's route. There are three very brief appendices giving (1) Notes on the author's collection of lepidoptera, (2) on his geological specimens, (3) a bibliography of the Great Crater Region. Those who have read the author's previous book will not need to be told that the book is written in a style which attracts and keeps the reader's attention from cover to cover, and of the value of a published account of these too little known regions, so we strongly advise everyone interested in this region of Africa to read the book. The chapter dealing with African elephants and the possibility of training them is of great economic interest, as are other chapters giving the possibilities of development of the region if transport were different. There is much of anthropological interest in the book, notably the photos of natives, including a very clear one of a Wambuti pygmy. The photo of the Washali village of boat-shaped houses, thatched with banana leaves, is very striking.

Petra: Perea, Phœnicia. A Forder. 25 x 18 cm. 112 pp. Marshall. 7/6.

The illustrations in this book are very wonderful, and there is a page of illustrations to every page of text, in fact, the author in his foreword states that he has given in picture form, with brief descriptions, an account of the places mentioned. The book will be as valuable to the geography class as to the scripture class, and should certainly be added to the shelves of the school library. The text not only describes the places illustrated, but gives the scriptural references to them.

Into Little Thibet. H. M. Boulnois. pp 256, 20 plates, several in colour from the author's sketches. London: Simpkin, 1923. 7/6.

This is a pleasantly discursive book about a journey from Srinagar through Kargil to Leh in Ladakh made by a lady, who had some difficulty in securing the permit necessary for such a venture. Her interests were towards natural history for the most part, but she remarks on many subjects and gives some interesting sketches, including one of Lamayuru, with its habitations partly perched on crags, which evidently dwarf utterly those some of us know castle-crowned on the wild upper Rhine. Leh, 12,000 feet or so above sea, is not so often discussed that we can dispense with any account of it; we only wish the authoress had told us more of this, and had reduced the chatter a little. There should be a map.

Politische Geographie. F. Ratzel and E. Oberhummer. xvi + 628 pp., 25 x 17.5 cm. München and Berlin, Oldenbourg publishers, 1923. Price, 16/- bound paper; 18/- cloth boards.

This famous work has been out of print for ten years or more, and Ratzel's scientific heir has had a hard task to bring out a new edition because the world has changed politically in such a marked way in the interval. It may be that a good many teachers of geography know Ratzel's standpoint through reading the works of his able and fervent disciple, E. C. Semple, or through reading the sharp if not always valuable criticisms of both Ratzel and Semple by Lucien Febvre, but it will probably nevertheless be helpful if we try to sketch here what Ratzel tried to cover as political geography. He was sufficiently the child of his age to be filled with the idea of the State, and to be deeply concerned with it as an expression of power, of rivalry, of intercourse, and conflict. He sees the state as a form of the spread of humanity over the earth, and notes that in the concept " state " we include a fragment of humanity and a fragment of the earth's surface to which that humanity is related, and we think of it as becoming more and more of an organism—a phrase which has led to endless debate and a phrase of which Ratzel saw the limitations at times. In this state-growth as in the union of the state (as idea) with its land Ratzel sees an endless succession of reciprocal influences, though one is at times inclined to think he does not make enough of the changes man has made, for better and for worse, in his environment. He tries to give general ideas about the development of group-shares and individual-shares in the land, the stages of agricultural evolution, relations of nomads and agriculturists and loss of mobility, with increase of complexity of the state and growth of the division of labour within it. Along with this goes the change from a determination of the state through some place or places within it to its determination by ever sharper boundary lines.

Ratzel then tries to generalise about growth of states, state areas and natural regions, always seeking geographical factors. He gives a section to " Situation," studying it in connection with climatic zones as well as with zones of political influence. Next comes " Area," studied again in connection with the world unit, and then looked at to find the political effects of large and small areas—be it noted with a rather blind hostility to the very small state. Area is also brought into human relations through chapters on densities of population and their implications. The section on frontiers leads up to the view that the frontier is a sort of perepheral organ of the state.

The junction of land and sea is considered under the headings of coasts, peninsulas, isthmuses, islands, and then comes a section on the sea and the waters of the earth generally. The concluding part touches the political influence of mountains and, to some extent, of plains.

All this is given with minimal alterations of Ratzel's words, and those alterations clearly indicated. An appendix gives Oberhummer his opportunity both to pay his tribute to Ratzel and to give a sketch of the rise of political geography as a study, with all its ups and downs, from the classical authors onwards. To him it seems to have been greatly advanced in men's estimation through Ratzel's work. That work has been discussed so often that we make no attempt to give another criticism here. To the reviewer it often seems that the author's anxiety is to find the best way to ensure the duration and the growth in power, area, population, and possessions of the state, rather than to study the matter dispassionately, but the latter aim would admittedly be a difficult one.

THE GEOGRAPHICAL TEACHER.

SUMMER 1924.

EDITORIAL.

THE Editor's first duty is to place on record the Geographical Association's deeply felt admiration for the work and personality of its former President, Professor Grenville A. J. Cole, F.R.S., whose long sufferings terminated in his death on April 20th. He had held since 1890 the professorship of Geology at the Royal College of Science, Dublin, and had long been also Director of the Geological Survey of Ireland. Of his special geological work this is not the place to speak, but we may be allowed to offer a special tribute to the valuable little sketch, entitled, "The Growth of Europe," wherein Professor Cole showed his great powers of exposition and his appreciation of the bearing of geology on land forms. The literary quality of his work was often as remarkable as the breadth of his scientific vision. Professor Cole by no means confined his attention to systematic geology, but overcame serious difficulties due to health in order to travel even in remote and very difficult regions of Europe; there must have been very few countries west of Russia that he had not explored in some detail. Travel and wide sympathies made him what one may call in the best sense a citizen of Europe, and in the days of her crisis he contributed an essay on "Ireland, the Outpost," which must surely help the citizens of that troubled land, whatever their special points of view. It is an essay that should circulate widely, especially among teachers of geography.

References have already been made to Professor Cole's long continued ill-health, through which he was sustained by his wife's heroic comradeship. To those who knew Professor and Mrs. Cole, the memory of their partnership will remain as an inspiration, and it is meet that our commemoration should make special mention of both.

Professor Cole was so anxious to encourage geographical teaching and research that he worked for the establishment of the Geographical Association of Ireland, affiliated to our own, and he kept the Association alive through the years of revolution and political crisis. His work for geographical teaching has been cut off while it was still full of unrealised possibilities, and we are left to mourn a most loyal friend and helper and a heroic soul.

THE Geographical Association of Ireland has suffered another severe loss through the death of Sir Walter Buchanan, K.C.I.E., M.D., etc. He was an enthusiastic supporter of geographical studies, and our members will recall his interesting article on "Geographical Distribution of Diseases" in our Magazine, Vol. XII (No. 66), p. 107.

THE Council of the Association last September decided to invite Mr. G. G. Chisholm, until recently head of the department of Geography in the University of Edinburgh, to give the Herbertson Memorial Lecture for 1924. Through the good offices of Mr. F. Debenham, the Association was invited to Cambridge for the lecture on February 28th, 1924, when appreciations of Mr Chisholm's work were offered by a number of members and visitors, among whom one may specially mention Dr. Haddon, the Chairman, and Professor A. P. Brigham, who was able to speak for American geographers. The lecture, entitled " The Goal of Commerce," will be found in the pages of this magazine. It only remains for us to wish our distinguished colleague, Mr. Chisholm, many years of health and comfort in which to work out the interesting studies he has planned to take up on retirement.

THE interesting summaries of the book on the Natural Regions of Spain, which have been made available for this journal by the work of a Hispanic specialist, are perforce suspended, as Prof. Cereceda's second volume has not yet appeared. It is greatly to be hoped that Prof. Cereceda, or someone following in his footsteps, may complete the study, as there are few regions of Europe about which it is so difficult to collect real facts. Our contributor may feel assured of the gratitude of many readers for the great effort he has made to present Cereceda's facts to British teachers.

THE Exeter Branch of the Association is asked to accept our heartiest thanks for its large hospitality on the occasion of the Spring Meetings. The University College entertained the Council of the Association and visiting members to dinner on April 4th. On April 5th visits were organised to many places of interest in Exeter, and meetings were held at 2-45 and at 7-30 p.m., the latter being addressed by W. Stanley Lewis, Esq., on Hungary, and the former by the Hon. Secretary. April 6th was utilised for a whole day on Dartmoor, while special arrangements were made for those members who were able to stay over the following day. There were exhibitions of maps of old Exeter and Publishers' Exhibitions organised specially for the meeting.

So many helpers contributed to the success of the meeting that it is difficult to make a complete list of those to whom thanks are specially due, but we may venture to make a partial one. First and foremost, our thanks are due to Mr. W. Stanley Lewis, whose organization of everything was perfect. Next we thank Alderman Stocker and Principal Hetherington, and through them the governing bodies of the University College; also Mr. Sheriff Vincent Thompson and Mr. H. Lloyd Parry, the Town Clerk, and through them the authorities of the city. Miss Cresswell and Mr. Tonar and Mr. S. K. Greenslade helped greatly as guides to the city. Several friends also most kindly offered hospitality to members of the Council during the visit. Our President, Sir Richard Gregory, contributed greatly to the success of the gathering, and several distinguished members came long distances to attend and to help. The members of the Association came away with a keen impression of the vitality of the University College of the South-West of England and of the value of the geographical work done there.

AT its Exeter meeting the Council of the Association unanimously ratified the suggestion made at the previous meeting to invite Professor John L. Myres, M.A., F.B.A., D.Sc., to become President of the Association for 1925. Professor Myres has already served as a member of the Council, and has helped the Association in many ways, while his great contributions to geography and history have made his name known among scholars the world over. In his capacity as Honorary Secretary to the British Association for the Advancement of Science, he has co-operated with the Geographical Association in many ways which are deeply appreciated.

THE Joint Matriculation Board of the Universities of Manchester, Liverpool, Leeds, Sheffield and Birmingham has recently altered the position of Geography in its School Certificate examination.

Geography is removed entirely from Group III.
Geography is placed in Group I.

In Group I the subjects are now—

(a) A qualifying paper in English Composition.
(b) English Literature, History, Geography, Scripture.

In order to pass in the Group, a candidate must pass in the qualifying paper, and also in either English Literature, or History, or Geography. Every candidate for either School Certificate or Matriculation must satisfy on the qualifying paper. The change comes into force in 1925.

In the Higher School Certificate Geography is, and has long been, a full subjects in two groups: IIb, " Modern Studies " and III " Science."

AN interesting experiment was tried during the Easter Vacation, when the Honours Schools, staff and students, in Geography at several Universities gathered at Malvern for a week's study of that district and for exchange of ideas and suggestions one with another. The leader of the experiment was Professor Roxby, who made the success of the gathering of 45 geographers. The gathering could not be made much larger for reasons of accommodation, but its success suggests that similar gatherings might spread far and wide. They are specially valuable in a subject like ours, in which there may be so much difference of emphasis in teaching and research.

IN response to our appeal (Geographical Teacher, Vol XII, p. 234), a number of members have kindly offered to deal with replies to the request for details about the position of geography in each secondary school. The first offer was from Mr. J. A. Butterfield, 102, Shipley Fields Road, Frizinghall, Bradford, Yorks. Will members therefore please send to him cards with (1) Name of School, (2) Public Examinations at which scholars are presented, (3) Number of scholars taking (a) their first and (b) their second public examination in 1924, (4) the particular Board of Education Regulation under which geography is recognised in the school, and (5) the names of the teachers of geography in the school.

DR. E. M. Sanders has very kindly prepared a valuable subject-index of the Library of the Association which will serve as a basis for the subject catalogue which we hope to be able to publish before the end of 1925. We have much pleasure in thanking her for this and other valuable services to geographical education.

THE Summer Schools, touching Geography, of which information has been sent to us, include that at Oxford under the auspices of the School of Geography of that University, that at Whitby under the auspices of the University of Leeds, and that of the City of London (address the Secretary, City of London Vacation Course in Education, Montague House, Russel Square, London, W.C. 1), Summer Course in Geography, Queen's University, Belfast, July 1—25 (Ministry of Education, North Ireland). Fuller information may be obtained from the sources indicated or from the Board of Education.

AMONG recent gifts to the Association we may specially mention a valuable set of photographic apparatus, offered by Mr. Richard Phillips, of Abbotsford, Kingsland, Shrewsbury, which must become most useful as the Lantern Slide Scheme of the Association develops. Our warm thanks are offered to Mr. Phillips.

Mrs. George Cadbury has most generously sent a gift of £2 towards the fund raised at the end of 1923 to place the Association on a sound financial footing.

Acknowledgment of several subsequent gifts will be made in the Spring Number for 1925.

THE New York Public Library, through its Director, asks members of the Association who may have spare copies, to help to make up a complete file for that institution. The missing numbers are 23, 38, 50, 51, 52, 53, and the Association's Office no longer has copies of these numbers in stock.

WE note with interest that the Ministry of Education for Northern Ireland has issued a circular asking schools to send information about the specific qualifications of their teachers of geography, in order that they may be assured that the subject is handled seriously. The Ministry proposes to organise Summer Courses for further improvement of the level of teaching of the subject.

THe Geographical Association warmly welcomes the decision of the authorities of the University of Birmingham to establish a Readership in Geography. The establishment of some such University post specifically assigned to Geography has been under consideration for two or three years. The Principal of the University has pressed the matter from time to time, in view of what was being done in other Universities and University Colleges, and the disadvantages arising from the absence of any such Readership or independent Lectureship in Geography for many branches of study; and the Principal, we understand, feels no small obligation to the Geographical Association for the valuable help given in stating the case for Geography. The chief difficulty so far has been simply and solely a question of funds. The urgent claims of many subjects already established on the finances of the University of Birmingham have been such as to prevent the Council from taking the necessary action to give to Geography the recognition and status that the subject deserved on its merits; but quite recently a private trust (through one or two of its members, whose names it is not permitted to disclose), after full discussion with the Principal, generously offered to endow for five years a Readership in Geography at £600 a year. The University will now have the opportunity of providing for Geography in this way; and it is not unreasonable to surmise that if the new Readership "makes good," it will be continued when the experimental five years have been completed.

The establishment of the Readership has been referred by the Council of the University to the Senate. It is the intention of the Council to proceed to an appointment in due course; and in all probability, in accordance with University practice, the appointment to the post will be advertised and applications invited on the usual lines.

THE Association offers its congratulations to the Burma branch on its enterprise in publishing a local journal, the first number of which has just reached us.

THE GOAL OF COMMERCE.

The Herbertson Memorial Lecture delivered at Cambridge, Feb. 28th, 1924.

By Geo. G. Chisholm.

PROF. HERBERTSON was a many sided geographer. Among the branches of that study to which he devoted special attention was Commercial, or, more broadly, Economic Geography. That in itself would be reason enough for taking a subject belonging to this branch for this memorial lecture. But there is no need for such a justification. You have done me the honour to invite me to deliver the lecture this year, and the least I can do in making the endeavour to meet your expectations is to take up the subject which I think I can handle with most interest and profit. Naturally that is one connected with what has been my main study for more than a generation, even as generations are now reckoned.

On looking back over the changes that have taken place in the text and tables of my "Handbook of Commercial Geography" since the publication of the first edition in 1889, I have been interested in noting the nature of those changes and how far they are merely developments of views either more or less explicitly set forth, or at any rate hinted at in the first edition; and I am presumptuous enough to think that it is worth while to try to interest you in that also.

I may mention that the introductory paragraphs of the book, pages 1—13 of the first edition, were the last written, but the plan of the work was from the first drawn up in such a manner as to secure data for world wide comparison and for bringing out tendencies in the evolution of commerce, especially since the industrial era. Changing conditions were taken for granted, but in these introductory paragraphs I have tried to indicate a general direction of those changes. In the twenty-first paragraph of the first edition, which remains unaltered as the twenty-third of the last edition, reference is made to the goal of commerce, and these words now form the headline of one of the pages on which this paragraph occurs. They seemed to me to form as appropriate a title as I could choose for what I wanted to say in the present lecture. They embody an idea which has always been prominent in my mind since I first took up the subject which has engaged so much of my thoughts, as is shown not only in the successive editions of my "Handbook," but in much of what I have published elsewhere either in books or periodicals. The paragraph goes on to indicate what I look forward to as the goal and the conditions of reaching it. The goal is that stage in the evolution of commerce when the inhabitants of the earth will be able to enjoy the greatest possible variety of commodities supplied at the least cost and with the greatest attainable stability of prices, and the only condition of reaching that goal on which stress is laid is the completion of all the main lines required in the network of communications. More recently indeed I have pointed to a remoter goal[1] not to be reached till all the peoples of the earth are educated intellectually and morally as nearly as possible to the same levels, and till coal, ores, and other irreplaceable materials are economically exhausted, and we are thrown back for mechanical motive power on current sun-power that is, not the bottled up sun-light, by which designation, I believe, George Stephenson described coal and similar fuels, but direct sun-heat, the fuel regularly made available by vegetation, and the circulation of wind and water kept up by the sun and so enabling us to make use of the force of gravitation. And even this remote goal, it seems to me, should be the subject of present consideration, inasmuch as the passage to that goal is already going on though exceedingly slowly.

The fact that the paragraph in my "Handbook" now referred to still stands (apart from its number) as it stood nearly thirty-five years ago, may be taken as evidence that the views expressed therein have remained in my mind unchanged. That is true, and yet the forecast just quoted from that paragraph is what, I suppose, must have been in the mind of the reviewer who made, I forget where, the criticism which struck me more than any other when the volume was first submitted to public judgment, and which, I felt, I could not challenge. The reviewer accused me, quite gently, I remember, of being rather sanguine in my anticipations. He had certainly every right to question such a venturesome prophecy, yet while conscious of his good grounds for doing so, I have deliberately passed it on from edition to edition without modification or explanation. I will say no more about it now, but propose to return to this point before concluding this lecture.

But, whatever may be the case in a remote and highly conjectural future, I give sufficient prominence even in the first edition of my "Handbook" to the causes that tend to make any progress towards a desirable goal very fluctuating. The greatest possible geographical advantages are, I point out, exhaustible. If they have the forms of mineral wealth, the minerals may be worked out. Locally such stores are constantly being worked out economically, that is, till it is no longer worth while to dig out what remains. If they consist in exuberant fertility, the ground may come to be occupied by such crowds of people that existence for them all can be obtained only at the cost of excessive labour, leaving for the great mass of the people no surplus for what we regard as the higher needs of life. Such has long been the case in far eastern countries. "Man," says De Quincey somewhere, "is a weed in those regions."

In considering our own country many have drawn attention to the essentially temporary character of some of the advantages on which we depend, and on the danger of relying on merely temporary advantages, I have from the first insisted. Among these I have always reckoned like the late Prof. Stanley Jevons, our abundance of good and favourably situated coal. In consequence of apprehensions in connection with this of the same sort as those to which Jevons gave such incisive expression I have both in my "Handbook" and elsewhere uttered views which, I thought, might naturally cause some comment or criticism, but which have so far passed without remark, perhaps because they seemed so preposterous as not to be worthy of comment. The rate of coal and iron production in the leading producing and consuming countries was the subject of a paper which I read to the Royal Statistical Society in 1890, and in which I indicated my opinion that we had no great reason to regret the tariffs raised by foreign countries against British manufactures on the ground that those tariffs helped to prevent a worse misdistribution of population and industry than that which, I thought, then existed; and nineteen years later I quoted this passage and repeated my adherence to that view in a lecture delivered in the University of Chicago.[2] On similar grounds, in a note which first appeared in the 6th edition of my "Handbook" but is continued to the last (p. 323), I pronounce our coal exports one of the healthiest features of British trade.

My uneasiness about changes in the distribution of population finds fuller expression in the paragraphs which now form 714 to 721 of the "Handbook," and is developed still more fully in a lecture originally delivered to the Glasgow Philosophical Society, and afterwards published in the "Bulletin" of the Philadelphia Geographical Society (Jan., 1913) and the "Scottish Geographical Magazine (Sept., 1913), under the title of "Malthus and some Recent Census Returns." The same concern was the cause of the attention given to the changes in the rates of increase of population in the tables given in "Longmans' Gazetteer of the World."

Closely connected with that subject was the reaction inevitably arising from differences in labour conditions in different parts of the world, which is now forcing itself more and more on the attention of all who give thought to international and social questions. Paragraph 30 and 259*a* in the first edition, respectively 39 (to which 40 has been added) and 377 (an extension of the original 259*a*) in the last edition, are the chief of those which touch on this question, but the ideas therein contained are more fully set forth in an article in the "Scottish Geographical Magazine," entitled, "The Geographical Prerequisites of a League of Nations" (July, 1919). In this article it is contended that low wages in the East, for example, are injurious to industries in this country in two ways, first, as helping to bring about excessively keen competition with those industries which are most exposed to their rivalry, and, second, as restricting the market for home industries through the limitation of the purchasing power of those who are paid such low wages; and in both these contentions I have the support of at least some leading business men.

As to the facts of the competition in cotton yarns and cloth in the Indian market, some figures were recently published in the "Manchester Guardian" which seem significant. The figures give for the financial years 1909-10 to 1921-2 the production in India of certain classes of cotton yarns and cotton tissues and the imports of the corresponding classes from the United Kingdom and Japan, and these have enabled me to calculate the proportions of each origin. From these figures it appears that Great Britain on the whole held her own even in yarns between 1909-10 and 1913-14, her percentage of the supply having been 5.54 in 1909-10 (out of a total of 664 million lbs.) and 5.3 (out of a total of 722 million lbs.) in 1913-14 (but as much as 6 per cent in 1912-13). It is noteworthy, however, that between these years it was in counts above twenties India made notable advances—increasing her proportion of those between 21 and 30, from 17.9 per cent. of the gross supply of yarns of all kinds to 23.1 per cent., of counts 31—40 from 2.38 per cent. to 2.73 per cent., while in this last class the United Kingdom diminished her proportion from 2.98 per cent. to 2.67 per cent. In tissues, on the other hand, the United Kingdom advanced from 68.9 per cent. of the supply (out of a total of 3,105 million yards) in 1909-10 to 71.9 per cent. (out of 4,278 million yards) in 1913-14. That the war should have made a difference in this respect was inevitable, but the actual facts are worthy of study. In 1918-19, the year in which the British share sank to its lowest, this country contributed only 33.5 per cent. of the total supply (2,540 million yards), as against 57.2 per cent. furnished by India and 9.3 per cent. furnished by Japan. But the sriking thing is that even since then this country has made hardly any recovery. In 1921-22 her share was only 34.2 per cent. (out of 2,679 million yards) against India's 62.7 per cent. and Japan's 3.1 per cent. In yarns the post-war decline was not so great, the respective shares of India, the United Kingdom, and Japan, in 1921-22, when the total supply was 742 million lbs., having been 93.3, 4.8 and 1.8 per cent.

In bringing about these changes low wages in the east, where wages have increased, especially in India, much less than in this country since the war, must be regarded as a contributory factor. It is often maintained that labour in the far east is not really cheap, that if wages are low that is fully counterbalanced by the inefficiency of the labourers, and that such progress as is made in the east to the detriment of British industry is to be explained rather by other favourable circumstances such as the local market, and, since the outbreak of the war, the higher cost of transport to the east. Still it must not be overlooked that those other favourable circumstances would not have had the effect they did in promoting the growth of industry in the east had it not been for those low wages. Mr. Arno Pearse, Secretary to the International Federation of Master Cotton Spinners' and Manufacturers' Association, in his Report on his last tour in India (1912), merely says that the low scale of wage for the Indian artisan minimises, not abolishes, the competition on this ground. But we must not exaggerate.

We should remember that down to the time of the war the advantages of the highly organised British cotton industry, with the highly skilled labour at its command, in some periods at least enabled the British to cope with eastern industries.

As showing how the second mode in which low wages in the east are deemed by business men to affect our trade injuriously, namely, through the low purchasing power of the mass of the people, I give the following quotations from the report of Bradford Dyers' Association, Ltd., at its meeting on the last day of February, 1922. "It is interesting," the Chairman of Directors says, "to look at the average earnings in India and China in order to form some idea of the purchasing power of the great masses of the people in these two countries. The only information I have been able to obtain relates to what I may fairly term the aristocracy of labour, namely, the workers generally in Shanghai, and the mill-workers in Ningpo and Bombay, whose earnings may be said with certainty to be very considerably higher than prevail generally in the two countries, yet they will suffice to bring home to you how slender is the purchasing power of probably over 90 per cent. of the people." He then goes on to give some details, from which it appears that in June, 1921, the average rates of pay in Shanghai for unskilled male workers (including mill workers) were equivalent to from 6.43d. to 12.86d. per day, while for such skilled workers as carpenters, bricklayers, stonemasons, blacksmiths and painters, the daily wage varied from 10.71d. to 19.2d. And he then goes on:—"While such wages are very far above the average in these two countries (China and India) you will appreciate how impossible it is for us, with costs in this country at anywhere like their present level, to recover the position of 1913," from which date, he adds, the export of cotton piece goods had so fallen that in 1921 it was the lowest for 52 years.

And now I may be asked, what is the remedy? But before I even try to answer that question, it is surely incumbent upon us to seek for the cause of these low wages. And in answering this latter question I go back to the views that have been expressed again and again from the time of the ancient Greeks. Aristotle, for example, in his "Politics," tells us in discussing Plato's "Republic," that "one would have thought that it was even more necessary to limit population than property,"[3] and that the neglect of this subject is a never failing cause of poverty among the citizens. Similar views have been uttered by thinkers of very various types. I need hardly refer to Malthus. But take Ruskin. "An island of a certain size has standing room only for so many people; feeding ground for a great many fewer than can stand upon it. Reach the limits of your feeding ground, and you must cease to multiply, must emigrate or starve. The modes in which the pressure is gradually brought to bear on the population depend on the justice of your laws; but the pressure itself must come at last, whatever the distribution of the land. And arithmeticians seem to me a little slow to mark the importance of the old child's puzzle about the nails in the horse shoe—when it is populations that are doubling themselves, instead of farthings."[4]

Clearly Ruskin is here thinking of an island cut off, so far at least as the food supply is concerned, from intercourse with any other part of the world. But, after all, the world is for man's needs merely a group of islands, set indeed in an ocean which can contribute something to human sustenance, and it is this whole group that Bernard Shaw has in view when he asserts his conviction that the Life Force will be compelled to "supersede humanity by evolving a higher species, if we cannot master the problems raised by the multiplication of our own numbers."[5]

I am well aware of the great difficulty of setting the facts of the population problem in a clear light. It does not need to be proved that the well-being of the inhabitants of any country is in no direct relation to the density of population, or that where a population seems to be redundant and suffering in consequence, relief will immediately ensue on any decrease in numbers. Mr. Carr-Saunders accepts from Prof. Cannan the "modern view" on the subject, that in any given conditions there is an optimum density of population, and that a community will suffer more or less if its population is either above or below this optimum.[6] With certain explanations I am ready to accept this statement too, but there are one or two points in the doctrine and Prof. Cannan's exposition of the facts on which it is based that seem to me to need clearing up.

First, in his book entitled "Wealth," Prof. Cannan points out (pp. 68-9) that the fact of variable proportionate returns for a given amount of labour is equally true of labour bestowed on manufactures and that devoted to agriculture (or the production of raw produce of any kind), and he deprecates the laying any special emphasis on this fact in agricultural industry. "The most we can say," he observes, "in contrasting agriculture and manufacture, is that the advantages of producing a large aggregate quantity, and therefore the advantages of a large population to produce and consume the large quantity are more obvious in manufacture than in agriculture." From the use of the term "advantages" in this statement, as well as from the whole context, it is manifest that Prof. Cannan has in his mind not merely the quantity but the value of the product, and that surely is made still plainer in what he says higher up, that "mankind cannot produce an unlimited amount of calico any more than an unlimited amount of wheat." No, but they could, if they could get unlimited quantities of material on which and with which to work, and that, too, in all probability without any diminution in the return of product to a given expenditure of labour and capital, so far as these were expended merely on the manufacturing operations. But the "principle" of West (and others) that Prof. Cannan is here contesting, relates solely to the quantity of the return; and while giving full weight to all that can be urged as to the modes in which the quantitative returns of agriculture may be even more than proportionately increased by improved methods of production and improved methods of transport, etc., facilitating the spread of those better styles of farming, and as to the possibility of further advances in the same direction by discoveries yet to be made, we cannot foresee conditions in which it would be possible to make a statement as to the unlimited production of agricultural produce such as that on which I have ventured with regard to the production of calico.

I am compelled to the belief that the check to the increase of the population on a higher standard of living is always felt first in the production of raw produce, agricultural or other. If a country depends largely on the export of cottons, the quantity of cottons that may be produced is limited in any one year among other things by the quantity of raw cotton obtainable and the number of customers for the goods, and this again, in the vast agricultural regions where the cottons are sold, on the number who have been able to get from their agriculture at least the means of subsistence with a little over, and under both heads it is agriculture that fixes the limit.

And even when we resort to manures to increase agricultural production relatively to labour and capital, there is a limit to that. "The law of diminishing returns, which holds for many things besides manures," says Mr. (now Sir) A. D. Hall in his "Cantor Lectures on Artificial Fertilisers," "expresses the fact that the first addition of manure gives the largest increase, and that with each further addition there is a progressively lower increment to the yield; the falling off being at first little, but growing rapidly, until at some point the increases ceases entirely, however much manure is put on."

Experiments conducted over a period of 13 years showed that on the average when four successive doses of an equal amount of the same nitrogenous manure were applied, the added yield of dressed wheat resulting from that addition was reduced from more than 10 bushels in the first application to only half a bushel in the fourth.

But, second, in considering this doctrine of optimum density, one is obliged to ask for a definition of the term. Sir William Beveridge, who also adopts this view, has given us a definition in a note to his presidential address to Section F at the recent Liverpool meeting of the British Association. "Optimum density," he there tells us, "is the density which will bring the largest return per head of the population."[7] But this definition leads to further queries. How are we to ascertain the largest return per head? The only total which I can imagine as giving even an apparent or nominal answer to this question, is one expressing values in currency. But is such an answer anything more than nominal? What are such values? Ratios; differences. And what significance in relation to real wealth, according to the definition of Adam Smith, who, as everybody knows, makes the real wealth of a country consist in its "land, houses, and consumable goods of all kinds," can be assigned to the summation of such differences. To see the force of this question one has only to think of the enormous increase since the war of the "wealth" of this country as expressed by the usual ratio, under the single head of house property, and bear in mind that the great bulk of that increase is on account of the property of that kind already in existence before the war, but greatly depreciated in real utility by wear and tear. It seems to me that this method of ascertaining the total return per head is valueless for the purpose for which it is proposed to use it. It is quantities of goods that constitute the real wealth of a country, and there is no method of arriving at a significant total for the heterogeneous multitude of commodities which any country produces. If we want to add up quantities we must make a selection of the articles the amounts of which are to be ascertained. If so, what articles shall we select? Shall we take gold, silver, sapphires, rubies, jade and other precious stones, pepper and other spices, amber, bronzes, ostrich and egret feathers, and the like? Whether these are the appropriate things to take depends on what we think the best means of satisfying human wants; and to form an opinion on that we must consider as best we can the infinite variety of the wants of the human individual. Some, and indeed most of the articles just enumerated, can obviously be obtained in sufficient quantity to supply the wants of only a very few, and it may be pointed out that some of them add to a total expressed in values not so much in virtue of the fact that they give in themselves much enjoyment to those few, as because few others possess them, and, if they are unique, like a picture by an old master or a lock of Milton's hair,[8] because no one else has them.

The infinite variety of human wants seems to make the problem of ascertaining anything that may serve as an indication of the total return per head insoluble. Yet I will venture to suggest some absolute values based on what one may reasonably take to be the needs of a perfected humanity. With that criterion in view, I would say that the things of which it is most important to have an adequate supply are those which are required to keep every man, woman and child in a fit condition to do with hearty enjoyment all that they have to do. That, it may be said, is an unattainable ideal, and I am not bound to show that it can ever be attained. But it may be taken as an ideal by which we may judge of the real value of absolute human goods, taking those to be most important which offer the surest hope of a steady, even if painfully slow, approach towards this ideal.

On that assumption I would consider as among the things of which it is most important to have abundant supplies, pure milk and wholesome food of all kinds, pure water, healthy clothing and shelter, air, space, light, leisure, and the capacity to enjoy leisure in human intercourse, indoor and outdoor recreation, the pursuit of science and art for their own sakes, the cultivation of everything that adds joy to life and unites people in sympathy with one another.

But you are entitled to ask, how are we even to find a road that seems likely to lead in the direction indicated? To try to answer that question we must proceed further with our analysis. Among the things just mentioned as of importance, some (food, shelter, fuel) are absolute necessaries for continued existence, and the smaller the amount of labour required for providing all with these, the more is available for the production of those required to furnish a higher degree of well-being for those who are kept in life. The problem then comes to be, first, how to make this surplus as large as possible, and, second, to ensure that the things needed for well-being are distributed over the population as widely as possible.

But this requires a little examination, and it may help us at this stage to give what seems to me the best statement of the teaching of Malthus that I have come across, that given by Dr. Warren S. Thompson in his "Population: A Study in Malthusianism."[9]

"Although," he says, "at any normal time there is food enough to keep alive all members of the population, yet it is only actual pressure upon subsistence (operating in certain portions of the population) or the fear of pressure (which assumes manifold forms), which keeps a population from multiplying more rapidly than it actually does."

Sundry reflections are suggested by this statement. First note that pressure upon subsistence is evidently regarded as affecting indirectly, if not directly, the great bulk of any population. Second, that actual pressure upon subsistence is taken to be felt at least by portions of the population. And, third, note that the reference is only to the keeping of the members of the population alive, not to keeping them all in the best of health. And can it be said even in this country, which is enormously wealthy if we estimate wealth by the simple method of the summation of ratios, there is no general pressure on the means of subsistence when we are told in an official publication of the Ministry of Health, that "the amount of milk in the daily diet should be somewhere in the region of a pint," and that "at the present time the average daily milk consumption of the population of England and Wales has been estimated at about quarter of a pint per head, and in some populous districts is as low as 0.08 or even 0.06 of a pint per head"?[10] If that is so, then I think it will give little satisfaction to those who are accustomed to think on such problems that we have approximately that density of population which gives the maximum production of wealth. That this unsatisfactory state of matters is connected with the distribution of population is hinted at in the extract just made. It is in "populous districts," we are told, that the consumption of milk is exceptionally low. But there are difficulties in sparsely peopled as well as densely peopled lands. In new lands, with wide areas, with favourable soil and climate, in which a large amount of land can be obtained by individual families for the production of a large amount of food with little labour, mere subsistence presents no difficulty. But man, Prof. Cannan reminds us, cannot live by bread alone. True; even in the economic sense. No one can forget that who has ever seen a prairie graveyard with its appalling number of graves of young wives at any age between seventeen and twice seventeen. There may be food enough, but a lack of some of the other things mentioned above as important requirements. Many of these come from a distance and at a heavy cost, arising from the numerous expenses inevitably involved in getting them into the hands of the consumer, and obviously these expenses must vary greatly with the nature of the commodity. And this is true not merely of manufactured goods sent to thinly peopled areas, but also of raw or semi-raw produce sent from these to the crowded manufacturing regions. For these it is a matter of importance that all necessary foods should be supplied cheaply. Some of these, like wheat and flour, can be brought even from great distances at comparatively little cost. Others, like potatoes, cannot be economically supplied from such great distances, and hence, if made available in adequate quantity, must be produced on nearer fields; and as for milk, it involves so much labour to produce and distribute as quite to account for the inadequate consumption in "populous districts."

And if that is true of milk, what about air, space, and light? "Loosen out the towns," says Sir Halford Mackinder; and so say I, too. But how is it to be done? I wish I knew. If it had been possible to foresee at the beginning all the consequences of the industrial revolution, we might perchance have had legislation more than a century ago designed to prohibit over-crowding when factories were introduced, and not to allow a factory population to grow up except in close relation to the country districts. If that had been possible it would undoubedly have proved a hindrance to the rapid development of factory industry, and a check consequently to the rapidity of increase of the population.

But there would have been incidental advantages that might have more than counterbalanced these and other disadvantages or apparent disadvantages. Man, says Prof. East of Harvard, has subdued the thinly peopled areas of the world too rapidly for his own good.[11] At home we should have escaped the ugly blots made by our industrial areas with their attendant evils. Our markets abroad, in particular India, where some domestic industries were so rapidly killed by the competition of Lancashire factory products, might have been able to avoid the baleful effects that actually followed. Somewhere, I believe, though I now cannot remember where, Sir William Hunter, speaking of the Indian muslin weavers who were thus deprived of their means of subsistence, made the grim and pregnant remark, "In times of famine it was they who died first."

But now that our great urban centres have been allowed to grow up, the task of dispersing them is surely one of unheard of difficulty. It has been calculated that if the population of London were provided for on a garden city basis, it would spread over an area stretching from Bletchley to Maidstone;[12] that is, one with a diameter of seventy-five miles.

The difficulties in the way of curing under-population are not so great as those which beset a country afflicted with over-population, and especially such over-populated agricultural countries as India, China, and Japan. "Because," says Prof. Buchanan of the Meio University, Tokyo,[13] "Japanese agriculture was so inelastic, seemingly unable to take over Western methods to any extent, the country population should be reduced to one-tenth, or even less, of what it was, the country people have remained behind. They remain chained to the areas, methods, crops, income, and opportunities of mediæval Asia, while the possibilities of life in the modern world are in plain view just beyond their reach." And similar observations might be made of the agricultural population of China and India. But for all States alike, I believe that it should be looked upon as a fundamental, perhaps the fundamental problem, to see how far it may be possible to secure an optimum density of population in the sense that I have indicated—the density most favourable to the general supply of what I have ventured to call absolute human goods.

It may be thought that, whatever may be the case with countries like those of the Far East, a country like ours, with a large surplus of capital and such an admirable manufacturing and commercial organization, can never go short. But we have already seen that in some vital needs it does go short, and it should always be kept in mind that the agriculture which so far has answered to our manufacturing and commercial development, has hitherto been based much more on advance into new fields of production than on the increase in productiveness of settled lands. "It cannot be too strongly urged," says Prof. East, "that the age of steel affected the population question solely because the world as a whole was still undermanned."[14] "The early experience of settlers in United States territory was unique in time."[15] And America, both North and South, is getting filled up rapidly. Some sixty years ago, in a deeply impassioned address at the close of the American Civil War, Emerson exclaimed: "America means opportunity, freedom, power. The genius of this country has marked out her true policy: opportunity—doors wide open—every port open . . . Let us invite every nation, every race, every skin; white man, black man, red man, yellow man. Let us offer hospitality, a fair field, and equal laws to all. The land is wide enough, the soil has food enough for all."[16] No one in the United States could say that now. First the yellow race was kept out, and from April, 1921, a general limitation has been placed on immigration from all countries, and there is at present a strong agitation for making that limitation still more severe.

To quote Prof. East once more:—"If world saturation of population, which approaches speedily, is not prevented, in its train will come more wars, more famine, more disease. With the struggle for existence made more acute by such a condition, the possibility of helpful co-operation among mankind disappears. He is compelled by circumstances to give rein to the instinct for self-preservation. He can do no less. It is no cogent argument against these statements to say that war, famine and disease have always afflicted mankind. This is a simple truth. There will be misery in the future as there has been in the past. But the *sine qua non* for preventing increased misery is a restricted population . . . With an unsaturated population every man *can* be given the freedom to achieve that of which he is capable, general hygiene can be promoted, and equitable distribution facilitated. These are the three lines of progress desired by honest and sensible socialists, and not opposed by honest and sensible conservatives. They are honourable objectives toward which civilization has been creeping. But it is the height of folly to suppose that these reforms, which depend upon the quasialtruism manifested in group co-operation, can ever make headway when the individual struggle for existence brings demands that crush both body and spirit."[17] Similar views are expressed by Mr. Bertrand Russell in his "Prospects of Industrial Civilization,"[18] but he throws in his statements on this head merely as an *obiter dictum* at the end of that volume. But if he is right, if this population problem is, as Huxley, I understand, insisted, the problem of problems, surely the sounder method of treating the subject with which he deals in that book would have been to start with that in view.

But if this is the problem of problems, and is only to be solved internationally, I see no necessity for waiting for a world-wide federation to bring about efforts in that direction. Consider the history of labour legislation in the United States. That is not a federal matter, but belongs to the province of the individual states. Their labour laws, however, have gradually been getting assimilated, largely if not mainly through the influence of public opinion. So also, if this question were generally recognised as the fundamental problem, co-operation between the ablest minds in all countries might lead to the passing of similar legislation in all with a view to its solution, legislation, that is, similar in aim, if nevertheless modified according to the special requirements of different countries in present conditions.

So far the only suggestion I have ventured on with a view to a solution, is the very general one of doing what can be done to raise the standard among the poorer classes of the coloured peoples as quickly as possible to the level of the whites, so far as that can be done.[19] And this is no new and no peculiar idea. In his "My Schools and Schoolmasters," Hugh Miller, referring to an old school-friend who had about 1840 been elected to the House of Representatives in Jamaica, mentions[20] that he had read "the outline of a well-toned, sensible address to his constituents, in which he urged that the sole hope of the colony lay in the education and mental elevation of its negro population to the standard of the people at home.'' And at the present time there is an influential section of the white labour party in the Union of South Africa urging that the best way for the industrial wing of that party to meet the unequal competition of skilled coloured labourers is to give every assistance to them to raise their standards and their wages to the same levels as those of the whites.

And this brings me back in conclusion to that early criticism of my '' Handbook,'' to which, as I have always had to avow to myself, I have no answer. '' Go, my son,'' said Oxenstierna, '' and see with how little wisdom the world is governed.'' That is about all I know of Oxenstierna, but that single saying has always caused me to regard him with respect. But I have no mind to re-echo the saying. I would rather say, '' Go and see how difficult it is to govern the world wisely, but see this with no disposition to lie prostrate before the difficulties, but with the firm resolution to do what little you can to overcome them, and with the faith, *and it can be no more than a faith,* that with human good will and human reason they can be overcome.''

Such hopes are often dashed by reminders of the constancy of human nature, by none more frequently or emphatically than by Dean Inge. The fact of this constancy need not be questioned. I have no wish to do so. Yet the Dean himself takes away the force of this appeal as a reason for despondency about ideals. '' No one can deny,'' he says,[21] '' the immense progress of knowledge, which, as we have seen, carries with it important ethical implications; nor the cumulative weight of experience gained by the method of trial and error. And it is by no means easy to separate this kind of progress from improvement in human nature itself.'' Yes; ''human nature changes not,'' but it comes to operate in very different circumstances. And that is all that we need to know for practical purposes, all that we have to remember not to be unduly daunted. One knows how much human nature there is in the growing enthusiasm of reformers so long as they feel they are on the right lines, how much, for example, in the exclamation of an eager follower of the Kerensky revolution in Russia—'' There is no end to what men can do—for there is no limit to their good will, if only they can be shown the way.''[22] But on the other hand, one can also recognise the human nature in another man of good will, Lewis Carroll (to give him the name by which he will always be best known), and one will sympathise with him when, in uncertainty as to the way that is shown, he expresses unwillingness to prostrate himself before Juggernauth in vain.

In the struggle for existence every species makes use of all the weapons it has. We are men, and the chief weapons of the human species are the human heart and the human brain. If Vauvenargues was right in saying that all great thoughts spring from the heart, no less right was John Morley in adding, '' Yes, but they must go round by the head.''

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[1] Scot. Geog. Mag., Vol. XXXIX (1923), p 137.

[2] Afterwards published in the Scot. Geog. Mag., Vol. XXV, 1909.

[3] Book 2, ch 6, p 40, of Jowett's translation.

[4] "Time and Tide," 1867, p 143 (near the end of Letter XXII).

[5] Preface to '' Androcles and the Lion," p 58.

[6] "The Population Problem," p 201.

[7] Economic Journal, No. 132 (Dec. 1923), p 468.

[8] If I may believe a newspaper paragraph, a lock of Milton's hair now enters into the total value of the wealth of the United States to the amount of about a thousand dollars.

[9] P. 14.

[10] Reports on Public Health and Medical Subjects, No. 9, '' Diet in Relation to Normal Nutrition,'' p 31.

[11] '' Mankind at the Crossroads.'' Scribner, New York, 1923. p 343.

[12] See the article on '' Population, Industrialism. War,'' by T. D. Barlow in the Annual Review for 1923 of the '' Manchester Guardian Commercial.''

[13] Quarterly Journal of Economics, Cambridge. Mass., Vol. XXXVII (August 1923), p 571.

[14] Ubi supra, p 55.

[15] Ibid, p 146.

[16] Quoted by Moncure Conway in '' Emerson at Home and Abroad,'' p 255.

[17] Ubi supra, pp 299—300.

[18] P. 273.

[19] Scot. Geog. Mag.. 1919, pp 253—4. See also Geog. Teacher, Vol. IX, 1917, pp 132—3.

[20] Edin, 1858, p 560.

[21] ''Outspoken Essays, Second Series,'' p 147.

[22] Ernest Poole, '' The Village,'' p 64.

BRITISH CLIMATE IN HISTORIC TIMES.

By Sir Richard Gregory, D.Sc., F.Inst.P., F.R.A.S.

PART II.—METEOROLOGICAL RECORDS.

RAINFALL AND TEMPERATURE RECORDS.

THE mean annual rainfall in London since 1774 is shewn in the following Table, together with mean values, and the differences from the average, of 155 years. The maximum value was 35.54 in. in 1903 and the minimum 12.50 in. in 1921. Taking groups of 10 years there were periods of general deficiency from 1780 to 1809, 1850 to 1859, 1890 to 1909, and 1920-1922, while periods of general excess were 1810 to 1849, 1860 to 1889, and 1910 to 1919. Of course, no real importance can be attached to these particular groups of ten years, and individual years in them are much above or below the average, yet the numbers show no continuous change either one way or another. The relatively dry period which began in 1919 was preceded by four years in each of which the rainfall was well above the average, and the excess for the ten years 1910-19 was much greater than for any of the other ten-year groups since 1780. Several other examples of three or more wet or dry years in succession may be selected from the Table. On the other hand, a very dry year may be preceded or followed by a very wet one, as in 1902, 1903, or what is more usual, at one period two dry years are followed by a wet year, while at another period this relation is reversed, two wet years being followed by a dry one. This is generally true not only for London but also for other places in Great Britain.

LONDON—ANNUAL RAINFALL.

	1770	1780	1790	1800	1810	1820	1830	1840
.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.
0		17.31	22.31	23.00	26.70	25.27	24.22	18.67
1		imp.	20.46	22.50	24.64	31.53	26.41	33.26
2		28.65	28.40	16.22	27.24	24.95	18.26	22.57
3		23.25	23.40	22.50	23.56	24.38	23.84	24.47
4	26.33	27.21	25.20	26.00	26.07	32.98	20.08	23.20
5	25.09	19.62	20.89	25.33	20.52	22.25	25.45	22.34
6	21.36	22.43	16.20	27.84	27.40	20.71	27.84	25.29
7	24.38	20.40	24.91	18.20	26.58	22.38	21.72	17.61
8	20.77	17.28	21.25	22.98	23.45	28.44	24.59	30.10
9	26.78	27.78	23.50	24.95	28.24	23.04	30.78	23.58
Sum	144.71	203.93	226.52	229.52	254.40	255.93	243.19	241.09
Years	6	9	10	10	10	10	10	10
Mean	24.12	22.66	22.65	22.95	25.44	25.59	24.32	24.11
Diff. from Average 155 years (23.88)	+0.24	—1.22	—1.23	—0.93	+1.56	+1.71	+0.44	+0.23

LONDON—ANNUAL RAINFALL.

	1850	1860	1870	1880	1890	1900	1910	1920
	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.
0	19.53	31.90	18.55	29.68	21.86	22.31	28.06	21.40
1	23.53	20.45	22.30	25.72	25.04	20.29	23.66	*12.50*
2	34.01	26.32	30.02	25.18	22.31	19.34	24.86	23.24
3	29.99	19.66	23.36	21.91	20.12	**35.54**	22.44	
4	19.01	16.38	19.95	18.05	26.89	20.66	23.85	
5	23.59	28.70	27.97	24.00	19.73	23.02	30.55	
6	23.27	30.72	24.10	24.21	22.42	24.74	29.76	
7	21.16	28.46	27.28	19.86	22.13	22.25	26.03	
8	17.70	25.15	28.98	27.51	18.85	23.78	28.35	
9	25.83	24.02	31.36	23.28	22.33	25.71	23.35	
Sum	237.62	251.76	253.87	239.40	221.68	237.64	260.91	57.14
Years	10	10	10	10	10	10	10	3
Mean	23.76	25.18	25.39	23.94	22.17	23.76	26.09	19.05
Diff. from Avg. 155yrs. (23-88)	—0.12	+1.30	+1.51	+0.06	—1.71	—0.12	+2.21	—4.83

PLACE OF OBSERVATION.

1774-80	Royal Society.
1782-91	South Lambeth.
1792-96	Edmonton.
1797	Temple Bar.
1798-1809	London (district not stated).
1810	Soho (roof) (Sir J. Banks).
1811-12	Luke Howard (Plaistow).
1813-14	Luke Howard (Tottenham).
1815-1922	Greenwich Observatory.

Data for years prior to 1815 were obtained by Mr. Carle Salter to show that 1921 was a " record " in the London district.

With such a variable element as rainfall, it is not surprising that ten-year averages should differ so widely as they do. Nevertheless ten-year groups of observations at Oxford since 1860 agree as regards excess or deficiency with corresponding groups for London. At Burnham, Norfolk, however, the two groups 1860-69, 1870-79, showed deficiencies from the mean, whereas in London the same periods were in excess. Similarly, at Chilgrove, Chichester, the differences are in the opposite direction from those of London for the four ten-year periods 1840-49, 1860-69, 1880-89, and 1900-09. The two following Tables from " British Rainfall " of 1920 and 1921 respectively show the extremes of annual rainfall during long periods and the general distribution of rainfall throughout the year.

EXTREMES OF ANNUAL RAINFALL DURING LONG PERIODS.

Station.	Period.	No.of years	Avg. of whole period.	Wettest year		Driest year	
				%	year	%	year
			Ins.				
Rothesay, Bute	1800-1921	122	49.92	143	1811	69	1855
Kendal, Westmorland	1800-1921	122	51.50	134	1872	63	1887
Greenwich, London	1815-1921	107	24.28	146	1903	52	1921
Radcliffe Obs.Oxford	1815-1921	107	25.66	158	1852	58	1921
Spalding, Lincs.	1829-1921	93	24.48	152	1880	52	1921
Chichester, Sussex	1834-1921	88	34.07	149	1852	57	1921
Armagh Observatory	1836-1921	86	31.90	129	1845	70	1870
Seathwaite,Cumberland	1845-1921	77	135.69	135	1861	65	1855

AVERAGE RAINFALL 1881-1915 COMPARED WITH AVERAGE 1820-1919.

MONTH	Greenwich			Kendal.			Rothesay.		
	Avg. 100 years 1820-1919.	Avg. 35 years 1881-1915.	Avg. 35 years as % of avg. 100 years.	Avg. 100 years 1820-1919.	Avg. 35 years 1881-1915.	Avg. 35 years as % of avg 100 years.	Avg. 100 years 1920-1919.	Avg. 35 years 1881-1915.	Avg. 35 years as % of avg. 100 years.
	Ins.	Ins.		Ins.	Ins.		Ins.	Ins.	
January	1.81	1.69	93	5.08	5.04	99	4.95	4.50	91
February	1.56	1.57	101	4.20	4.08	97	4.09	4.00	98
March	1.59	1.73	109	3.83	4.10	107	3.73	3.59	96
April	1.60	1.47	92	2.69	2.98	107	2.75	2.98	108
May	1.87	1.73	93	2.74	3.14	115	2.81	3.03	108
June	1.98	2.02	102	3.32	2.91	88	3.15	3.07	97
July	2.44	2.24	92	4.12	3.98	97	3.70	3.96	107
August	2.38	2.19	92	5.02	5.11	102	4.65	4.87	105
September	2.15	1.79	83	4.46	3.95	89	4.24	4.05	96
October	2.67	2.53	95	5.43	4.89	90	4.99	4.41	88
November	2.30	2.28	99	5.21	5.10	98	5.21	5.07	97
December	2.02	2.26	112	5.71	5.97	105	5.46	5.45	100
Year	24.37	23.50	96	51.81	51.16	99	49.73	48.98	98

It is of interest to compare the monthly totals of rainfall at Greenwich for a period of years with the average in order to see the numbers above and below it. This is done in the subjoined Tables. One point brought out by this comparison is that August and September have tended to be drier in the second half of the period 1841-1922 and December to be wetter. This is true also if the period 1816-1915 is taken.

Greenwich monthly totals of Rainfall for 82 years (1841 to 1922) compared with 60 years average (1841-1900).

Monthly Totals	Jan.	Feb.	Mar	Apr.	May	Jun.	July	Aug	Sep.	Oct.	Nov	Dec.	Year
First half of period 1841 to 1881:—													
above average	21	15	18	20	20	16	17	22	22	16	19	17	223
below average	20	26	28	21	21	25	24	19	19	25	22	24	269
Second half of period 1882 to 1922:—													
above average	15	19	18	21	14	20	19	15	11	14	17	25	208
below average	26	22	28	20	27	21	22	26	30	27	24	16	284

GREENWICH RAINFALL.

	Jan.	Feb	Mar	Apr	May	Jun.	July	Aug	Sep.	Oct.	Nov	Dec.	Year.
	50 Years, 1816 to 1865												
Mean	1·74	1·50	1·52	1·58	2·08	1·92	2·49	2·35	2·35	2·76	2·42	1·83	in. 24·54
	50 Years, 1866 to 1915												
Mean	1·91	1·61	1·63	1·61	1·77	2·06	2·32	2·29	2·00	2·61	2·20	2·30	in. 24·31
	100 Years, 1816 to 1915												
Mean	1·83	1·55	1·58	1·60	1·92	1·99	2·40	2·32	2·17	2·68	2·31	2·06	in. 24·41

CHRISTMAS WEATHER.

The association of snow with Christmas, common in Christmas stories and almost an essential feature of Christmas cards, is one for which little meteorological evidence exists so far as London and the neighbourhood is concerned. The Astronomer Royal has been kind enough to extract for me from the Greenwich records all the dates on which snow fell not only on Christmas Day but also on the day before and day after, and the result is as follows:—

DAYS ON WHICH SNOW FELL DURING THE PERIOD 1840-1922.

Dec. 24. 1846. 1849.
Dec. 25. 1869. 1876. 1878. 1884. 1887. 1895.
Dec. 26. 1869. 1870. 1874. 1877. 1884. 1896. 1887. 1895. 1906. 1917.

It will be seen, therefore, that in the period of 83 years, snow fell in London on Christmas Eve on two occasions only, namely, 1846 and 1849, and has not been recorded at Greenwich on that day for 73 years. There are only six years in which snow has fallen on Christmas Day and ten on Boxing day. Grouping all three days together, the chances against snow are nearly five to one, or taking Christmas Eve and Christmas Day together, not in one year in ten has a fall of snow been recorded. The snowy Christmases of imaginative writers and artists have thus but rare existence in the south of England, yet popular fancy demands that they should be so described and depicted.

Probably the description of Christmas at Dingley Dell in "Pickwick Papers" is largely responsible for the general impression as to what Christmas weather ought to be, but actually there are rarely severe frosts until after Christmas. The mean air temperature for 24 hours of Christmas Day in London since 1814 is shown in the subjoined table, from which it will be seen that in the 109 years included there were 23 years in which the mean temperature was at freezing point or below. The lowest mean temperature 18.6° in 1830 and the next 19° in 1860 and 1870. There are only three periods in which three or more successive Christmas Days had a mean temperature at freezing point or below, namely:—1814-20, 1829-31, and 1890-92. Not for a single Christmas Day since 1892 has the mean temperature in London been down to 32°; and in this 30 years the minimum temperature has only been at freezing point or below in ten years—one year in three. The highest mean temperatures on Christmas Day were 1824, 53°.1; 1837, 51°.5; 1852, 50°.7; and 1920, 50°.6. Though mild and severe Christmases have occurred at irregular intervals since 1814, there has not been such an unbroken series of Christmas Days with a mean temperature above freeing point as that recorded since 1892 in London.

CHRISTMAS DAY MEAN AIR TEMPERATURES (LONDON).

Year.	Mean. Temp.	Year.	Mean Temp.	Year.	Mean Temp.	Year.	Mean Temp.
1810		1840	25.4	1870	19.0	1900	48.2
1		1	41.8	1	40.7	1	35.9
2		2	40.0	2	49.3	2	44.1
3		3	49.3	3	41.0	3	38 7
4	25.7	4	32.7	4	33 7	4	35.2
5	30.3	5	40.0	5	43.6	5	39.8
5	36.9	5	28.7	6	35.0	6	36.8
7	30.6	7	37.6	7	33.6	7	39.5
8	31.6	8	40.8	8	22.0	8	37.7
9	31.2	9	23.7	9	34 5	9	37.1
1820	29.7	1850	39.7	1880	34,2	1910	43.4
1	38,2	1	34.8	1	35.7	1	42.3
2	31.6	2	50.7	2	45.1	2	47,1
3	47.4	3	30.9	3	41 5	3	36 7
4	53,1	4	48 3	4	35.8	4	33.0
5	45.9	5	43.3	5	33.3	5	45.6
6	41.9	6	28.9	6	35.3	5	36.7
7	44.4	7	46 0	7	33.7	7	38.7
8	40.6	8	41.3	8	41.2	8	34.5
9	27.4	9	39.7	9	35 8	9	39.1
1830	18.6	1860	19.0	1890	25.3	1920	50.6
1	27 5	1	37.2	1	30.4	1	41.3
2	49.7	2	45 5	2	28.3	2	39.7
3	40.9	3	44.4	3	44.0		
4	40.9	4	33 1	4	47.6		
5	21 3	5	41.0	5	34.2		
6	28.4	6	40 7	6	40.7		
7	51.5	7	36 5	7	33.5		
8	31.9	8	41.2	1	45.0		
9	44 9	9	31.3	9	37.7		

DAYS OF SKATING.

The National Skating Club formerly possessed the right to flood the lawn of the Toxopholite Society in Regent's Park during certain months of the year, and the Club kept a record of the numbers of days of skating during the seventy-four winters from 1830-1 to 1903-4. Dividing this period into groups of five years, we get the results shewn in the following table:—

	Mean Annual No. of days of skating.		Mean Annual No. of days of skating.
1830-5	7.6	1865-70	7.2
1835-40	12-8	1870-5	11.6
1840-5	18.8	1875-80	21.4
1845-50	12.2	1880-5	4.2
1850-5	10.0	1885-90	16.0
1855-60	7.0	1890-5	31.2
1860-5	10.0	1895-1900	2.4
1900-4 (4 years), mean, 7.7 days.			

It will thus be seen that there has been no progressive increase or decrease in the number of days of skating in London for nearly a century. Years in which there was no skating occur at irregular intervals throughout the period. The highest number of days is 53 in 1894-5, and then in descending order we have 1877-8, 47 days; 1878-9, 46 days; 1890-1, 42 days; 1844-5, 41 days; 1885-6, 38 days; 1837-8, 37 days; 1860-1, 32 days; 1840-1, 31 days. For each of the remaining winters the number of days of skating was under 30. The average of the whole period is 12 days of skating annually.

BRÜCKNER'S CYCLE.

The origin of the belief in a progressive and permanent change of climate in historic times is probably to be found in the fact that temperature and rainfall everywhere have a tendency to vary in a period having an average length of thirty-five years. This cycle was referred to by Francis Bacon in his essay, "Of Vicissitude of Things," and was worked out in detail by Prof. E. Brückner, of Berne, some years ago. Neglecting individual years, it may be stated that for about half this period of about thirty-five years the weather is warmer and drier than the average, and for the other half colder and wetter. The groups of years for which Brückner found clear evidence of these characteristics are as follows:—

Warm.	Dry.	Cold.	Wet.
1746—1755	1755—1770	1731—1745	1736—1755
1791—1805	1781—1805	1756—1790	1771—1780
1821—1835	1826—1840	1806—1820	1806—1825
1851—1870	1856—1870	1836—1850	1841—1855
		1871—1885	1871—1885

It will be noticed that the interval from the beginning or end of one period to the beginning or end of the next of the same kind varies from twenty to fifty years, but the average is about thirty-five years. The series of wet years which culminated in the black year of 1879, memorable to all who were then engaged in agriculture, was matched by the wet period of 1910-1918. If the cycle holds good we may expect that, on the average, the weather will be warmer and drier than usual for a few years, but any single year may depart from this rough generalisation.

The following table shows the mean annual temperatures for the various meteorological districts in Great Britain from 1878 to 1920, and it will be seen that, while the lowest values occurred in most districts in 1879, the highest were in 1892 and 1898, thus following the order of Brückner's cycle. Taking the districts as a whole, the greatest deviation from the normal was $-2^{\circ}.3$ in 1879 and $+1^{\circ}.6$ in 1898, and the difference between the maximum and minimum mean temperatures in any district is about 4°.

METEOROLOGICAL OFFICE. DISTRICT VALUES. 1878 TO 1920.

FIRST LINE SHOWS MEAN TEMPERATURE FOR THE 35 YEARS, **1881-1915.**

	EASTERN DISTRICTS.						**WESTERN DISTRICTS.**					
	0 Scotland, N.	1 Scotland, E.	2 England, N.E.	3 England, E.	4 Midland Counties.	5 England, S.E.	6 Scotland, W.	7 England, N.W. and N. Wales.	8 S. Wales and England, S.W.	9 Ireland, N.	10 Ireland, S.	Districts 1-10
	°	°	°	°	°	°	°	°	°	°	°	°
Normal (1881-1915)	45.5	45.9	47.5	48.6	48.0	49.6	47.5	48.4	49.5	48.0	49.6	48.2
1878 ...	46.0	46.1	47.7	48.7	49.1	49.9	48.3	49.0	50.7	48.8	50.4	48.9
1879 ...	*43.9*	*43.2*	*44.8*	*45.6*	*45.6*	*46.7*	*45.2*	*45.7*	48.2	*45.9*	*48.1*	*45.9*
1880 ...	46.1	46.0	47.5	48.6	48.2	49.8	47.6	48.4	51.0	48.4	50.1	48.6
1881 ...	44.2	44.2	46.0	47.5	47.2	48.9	46.0	47.1	49.2	47.2	48.8	47.3
1882 ...	46.3	46.3	48.2	48.9	48.5	50.2	47.9	48.8	50.1	48.5	49.6	48.7
1883 ...	45.5	45.9	47.2	48.3	40.8	49.5	47.2	48.1	49.4	47.8	49.2	48.1
1884 ...	46.1	46.7	48.5	49.6	49.3	50.8	48.2	49.1	50.5	48.6	50.0	49.2
1885 ...	44.4	44.9	46.6	47.3	47.1	48.8	46.0	46.7	48.5	47.0	48.4	47.1
1886 ...	44.4	44.6	46.2	47.3	47.2	48.8	46.0	46.9	48.6	46.8	48.5	47.2
1887 ...	45.0	45.9	46.4	46.9	46.8	47.9	46.5	47.1	48.4	47.8	49.0	47.3
1888 ...	44.4	44.9	45.9	46.8	46.5	48.0	46.5	46.9	48.1	47.3	48.7	47.0
1889 ...	46.2	46.4	47.2	47.7	47.8	49.3	47.8	48.1	49.2	48.3	49.6	48.2
1890 ...	46.2	46.3	47.4	47.5	47.3	489	47.5	47.9	49.0	48.2	49.5	48.0

METEOROLOGICAL OFFICE. DISTRICT VALUES. 1878 TO 1920.

	EASTERN DISTRICTS.						WESTERN DISTRICTS.					
	0	1	2	3	4	5	6	7	8	9	10	
	Scotland, N.	Scotland, E.	England, N.E.	England, E.	Counties. Midland	England, S.E.	Scotland, W.	England, N.W. and N. Wales.	S. Wales and England, S.W.	Ireland, N.	Ireland, S.	Districts 1-10.
Normal	o	o	o	o	o	o	o	o	o	o	o	o
1891 ...	45.3	45.4	46.3	47.3	47.0	48.7	47.1	47.6	48.6	47.6	48.8	47.4
1892 ...	*43.6*	44.0	45.5	46.6	46.1	48.2	45.9	46.6	48.2	46.8	48.3	46.6
1893 ...	46.5	47.0	48.5	49.4	49.6	51.0	48.7	**50.1**	51.2	**49.6**	51.0	49.6
1894 ...	46.3	46.0	47.4	48.6	48.4	50.2	47.8	49.1	49.9	48.3	49.8	48.6
1895 ...	44.8	44.8	46.8	47.6	47.2	48.9	46.4	47.5	48.8	47.1	48.6	47.4
1896 ...	46.3	46.7	47.9	48.5	48.3	50.1	48.0	49.0	50.1	48.5	50.1	48.7
1897 ...	45.5	45.9	47.7	48.7	48.5	50.7	47.7	48.9	50.5	48.2	50.3	48.7
1898 ...	**46.7**	**47.4**	49.0	49.8	49.5	**51.4**	**49.0**	50.0	**51.2**	49.5	**51.3**	**49.8**
1899 ...	46.3	46.3	48.1	49.4	49.0	51.2	48.1	49.3	**51.2**	49.1	51.0	49.3
1900 ...	45.6	45.8	48.0	49.3	48.7	50.4	47.6	48.7	50.0	48.2	49.6	48.6
1901 ...	46.1	46.1	47.7	48.3	47.9	49.4	47.5	48.4	49.5	47.9	49.3	48.2
1902 ...	45.0	44.9	47.0	48.0	47.5	49.1	46.9	47.7	49.2	47.8	49.6	47.8
1903 ...	45.0	45.4	47.5	49.1	48.1	50.0	47.4	48.4	50.0	47.9	49.5	48.3
1904 ...	45.7	45.7	47.9	48.9	47.8	49.5	47.3	48.1	49.7	47.8	49.6	48.3
1905 ...	46.0	46.3	48.0	49.0	48.1	49.4	47.7	48.4	49.2	48.6	49.9	48.5
1906 ...	45.6	46.5	48.5	49.7	49.0	50.0	48.0	48.6	49.5	48.1	49.9	48.8
1907 ...	45.3	45.5	47.4	48.6	47.8	49.3	47.3	47.8	48.8	47.8	49.3	48.0
1908 ...	46.3	46.2	47.8	48.6	48.1	49.4	48.1	48.3	49.7	48.8	50.2	48.5
1909 ...	44.7	44.8	46.7	47.7	47.0	48.3	46.3	47.1	48.5	47.6	49.0	47.3
1910 ...	45.6	45.5	47.6	49.0	48.2	49.6	47.4	48.2	49.4	48.0	49.4	48.3
1911 ...	46.5	46.7	49.0	**50.4**	**49.7**	51.0	48.4	49.8	50.8	48.9	50.3	49.3
1912 ...	45.6	45.7	47.6	49.5	48.3	50.0	47.4	48.4	49.7	48.0	49.6	48.4
1913 ...	46.6	46.4	48.4	49.8	48.9	50.7	48.0	49.3	50.4	48.4	49.6	48.9
1914 ...	46.6	46.6	**49.3**	50.2	49.5	50.7	48.4	49.5	50.4	48.7	50.2	49.3
1915 ...	45.1	44.8	47.1	48.6	47.8	49.3	46.6	47.7	48.9	47.5	49.1	47.8
1916 ...	45.9	45.3	47.8	48.7	48.0	49.6	47.7	48.6	49.6	48.0	49.6	48.4
1917 ...	45.0	44.6	46.6	47.5	47.1	48.2	46.6	47.3	*47.8*	47.1	48.6	47.1
1918 ...	45.5	45.5	48.2	48.9	48.9	50.0	47.7	48.9	50.0	48.6	50.2	48.7
1919 ...	44.2	44.2	46.4	47.1	46.9	48.4	46.0	47.1	48.3	47.1	48.9	47.0
1920 ...	46.2	46.1	48.4	49.5	8.84	50.4	48.0	49.1	50.0	48.6	50.0	48.9

Mean annual rainfalls in London for 200 years, and temperatures for 160 years, are represented graphically in Fig. 1.

SEASONAL TEMPERATURES.

The warmest and coldest seasons do not correspond with the warmest and coldest years. Thus Buchan's discussion of observations for his determination of annual values for the period 1763 to 1892 gives the warmest and coldest seasons in that period as follows, for London:—

WARMEST SEASONS.

Winter.	Spring.	Summer.	Autumn.
1779 + 8°.3	1811 + 5°.2	1783 + 8°.2	1777 + 5°.1

COLDEST SEASONS.

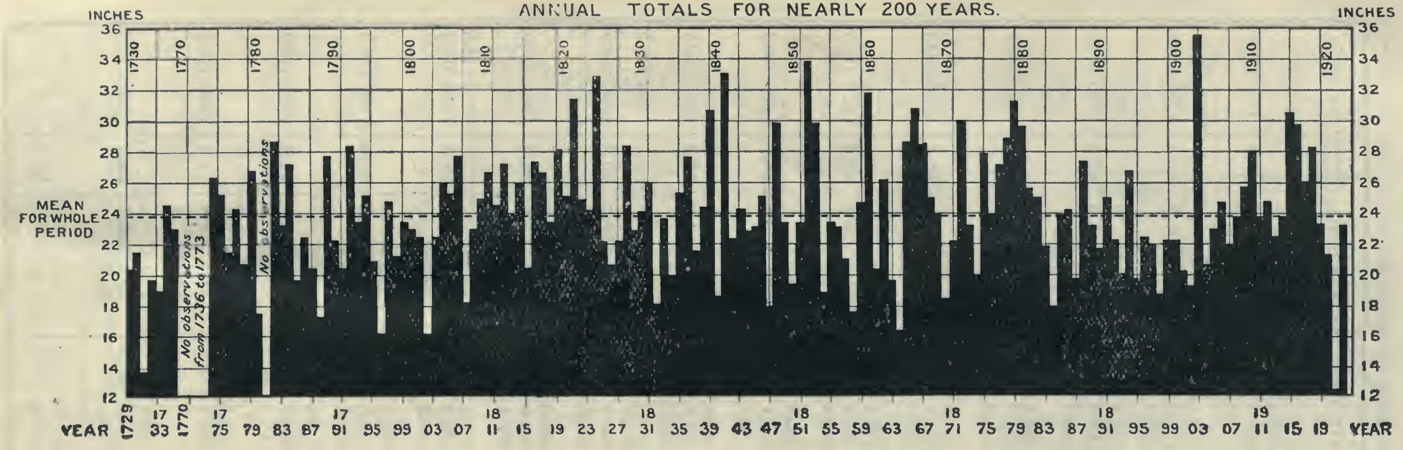
Winter.	Spring.	Summer.	Autumn.
1814 – 6°.5	1837 – 6°.7	1816 – 4°.6	1877 – 4°.1

The mean temperatures of the various months from I (January) to XII (December), and of the seasons from 1770, from observations in the London area, are shown in the following Table, the highest temperatures being indicated by thick type. The differences between the seasonal results in this Table and those found by Buchan are due to the difference in the periods covered by the observations discussed.

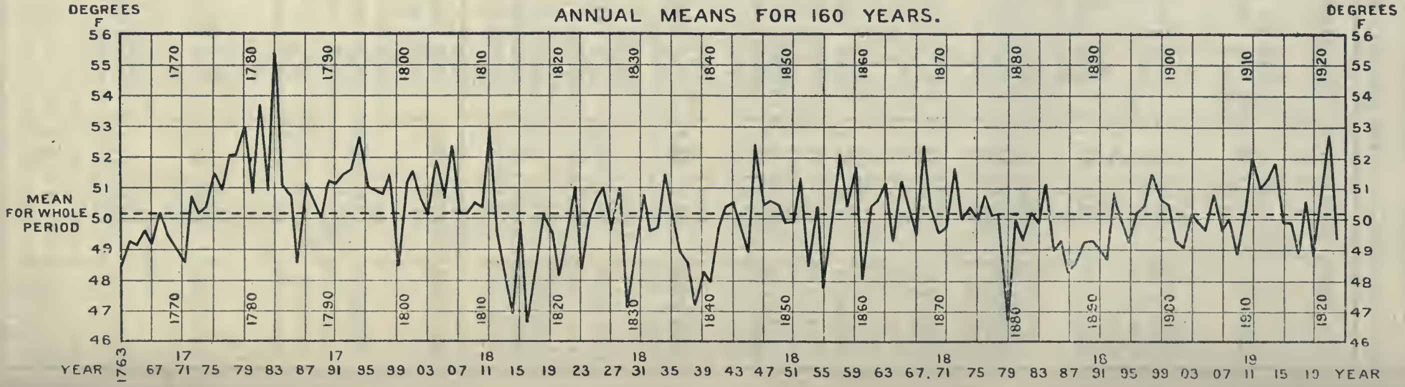
MEAN AIR TEMPERATURE AT DIFFERENT SEASONS.

150 YEARS. **1770 to 1919.** (LONDON).

YEARS	SPRING		SUMMER		AUTUMN		WINTER		YEARS (Group of)	YEARS
1770-1779	iii 41.1 iv 45.1 v 51.7	46.0	vi 58.0 vii 61.8 viii 61.4	60.4	ix 55.8 x 49.4 xi 41.8	49.0	xii 39.4 i 33.9 ii 37.8	37.0	48.1	1770-1779
1780-1789	38.8 44.9 52.8	*45.5*	58.4 61.5 60.0	60.0	55.7 47.3 39.5	*47.5*	36.1 34.9 36.6	*35.9*	47.2	1780-1789
1790-1799	40.4 45.9 50.9	45.7	56.3 60.9 60.1	59.1	55.8 48.9 41.8	48.8	37.5 36.0 38.5	37.3	47.7	1790-1799
1800-1809	40.6 45.1 53.7	46.5	57.6 61.3 62.1	60.3	56.6 49.6 41.8	49.3	39.1 37.0 38.5	38.2	48.6	1800-1809
1810-1819	41.3 45.6 51.6	46.2	56.8 59.9 59.4	*58.7*	57.8 49.9 42.5	50.1	37.8 35.2 39.2	37.4	48.1	1810-1819
1820-1829	41.8 47.0 52.6	47.1	58.2 61.8 60.2	60.1	56.7 49.9 43.3	50.0	40.8 35.4 38.1	38.1	48.8	1820-1829
1830-1839	41.3 44.5 52.9	46.2	58.8 62.3 60.3	60.5	55.4 50.1 43.1	49.5	39.9 36.0 38.5	38.1	48.6	1830-1839
1840-1849	41.9 46.8 54.3	**47.7**	59.6 61.2 61.2	60.7	56.8 49.5 44.0	50.1	39.6 37.6 38.4	38.5	**49.3**	1840-1849
1850-1859	41.1 46.3 50.9	46.1	59.0 62.3 62.0	**61.1**	57.1 50.5 42.6	50.1	40.2 38.9 38.9	39.3	49.2	1850-1859
1860-1869	40.9 48.0 53.1	47.3	58.2 61.3 60.6	60.0	57.6 50.6 42.1	50.1	40.7 38.1 40.8	39.9	**49.3**	1860-1869
1870-1879	41.9 47.0 51.0	46.6	58.6 62.3 61.9	60.9	56.4 49.4 41.9	49.2	37.7 39.0 39.7	38.8	48.9	1870-1879
1880-1889	40.6 45.3 52.1	46.0	58.0 61.6 60.8	60.1	56.3 47.5 43.5	49.1	39.3 37.0 39.3	38.5	48.4	1880-1889
1890-1899	42.2 46.9 52.4	47.2	59.3 61.7 61.5	60.8	57.7 48.9 44.3	**50.3**	39.2 38.0 39.1	38.8	**49.3**	1890-1899
1900-1909	41.2 45.7 51.6	46.2	56.6 61.9 60.3	59.6	56.1 50.3 43.5	50.0	40.3 39.2 38.8	39.4	48.8	1900-1909
1910-1919	41.6 45.6 54.1	47.1	58.0 60.5 61.4	60.0	56.3 49.4 42.8	49.5	42.4 39.4 40.3	**40.6**	**49.3**	1910 1919
Mean 150 Years		46.5		60.2		49.5		38.4	48.6	


RAINFALL: LONDON AND GREENWICH

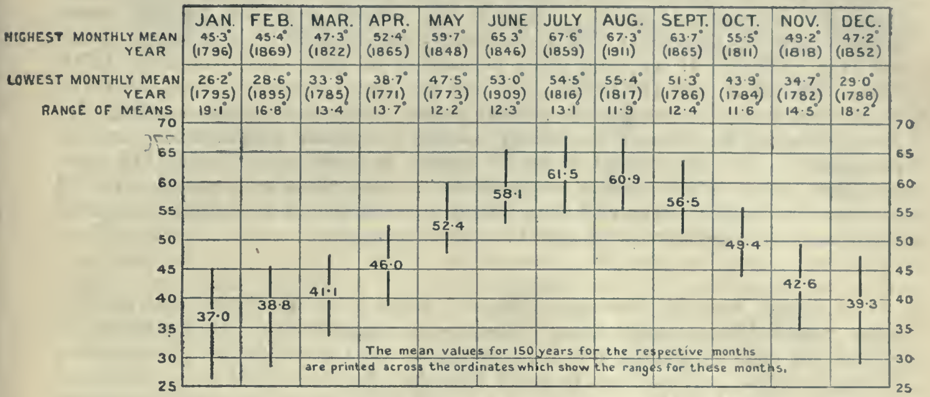
ANNUAL TOTALS FOR NEARLY 200 YEARS.


AIR TEMPERATURE: GREENWICH OBSERVATORY

ANNUAL MEANS FOR 160 YEARS.

FIG. 1.

AIR TEMPERATURE - LONDON AND GREENWICH
150 YEARS 1770 TO 1919
HIGHEST & LOWEST MONTHLY MEANS



	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.
HIGHEST MONTHLY MEAN	45·3°	45·4°	47·3°	52·4°	59·7°	65·3°	67·6°	67·3°	63·7°	55·5°	49·2°	47·2°
YEAR	(1796)	(1869)	(1822)	(1865)	(1848)	(1846)	(1859)	(1911)	(1865)	(1811)	(1818)	(1852)
LOWEST MONTHLY MEAN	26·2°	28·6°	33·9°	38·7°	47·5°	53·0°	54·5°	55·4°	51·3°	43·9°	34·7°	29·0°
YEAR	(1795)	(1895)	(1785)	(1771)	(1773)	(1909)	(1816)	(1817)	(1786)	(1784)	(1782)	(1788)
RANGE OF MEANS	19·1°	16·8°	13·4°	13·7°	12·2°	12·3°	13·1°	11·9°	12·4°	11·6°	14·5°	18·2°

The mean values for 150 years for the respective months are printed across the ordinates which show the ranges for these months.

FIG. 2.

AIR TEMPERATURE: ROYAL OBSERVATORY, GREENWICH

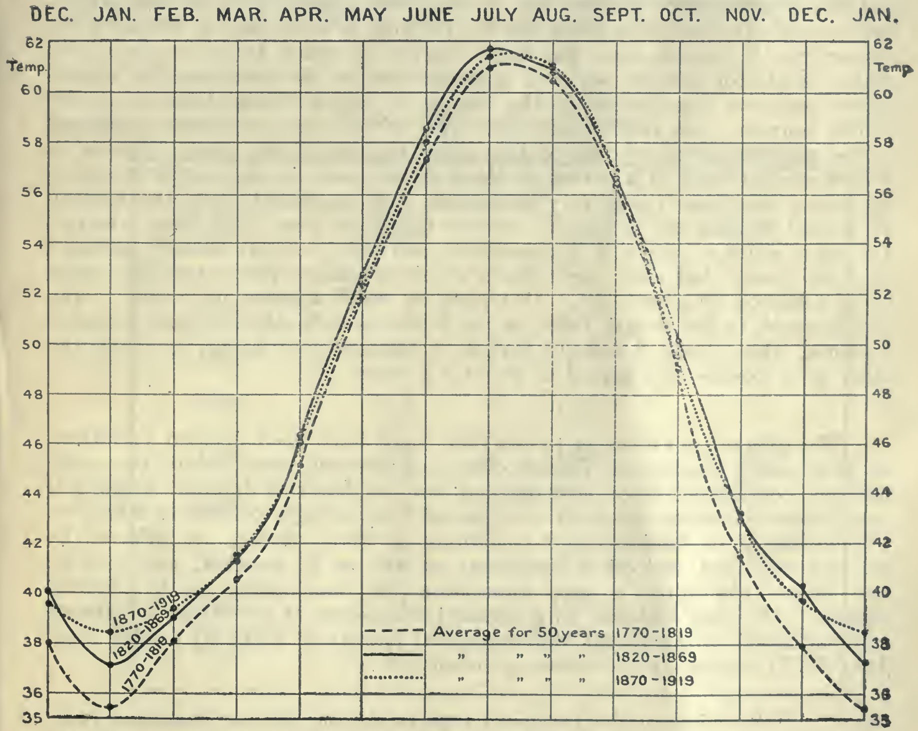


FIG. 3.

The range between the highest and lowest monthly means varies between 12° and 19°, and is greatest for the winter months, as will be seen from the diagram (Fig. 2). It will be noticed that the highest mean temperature for December (1852) is practically the same as the lowest mean for May (1773). If we take three periods of 50 years each, namely, 1770-1819, 1820-1869, and 1870-1919, and plot the mean monthly temperatures of Greenwich for each, we get the curves shown in the next diagram (Fig. 3). An interesting fact thus brought out is that the winter temperatures show a progressive increase, being about 3° higher for the period 1870-1919 than for 1770-1819. This increase may be due to the great increase of artificial heat in the London area, and thus afford an example of an actual change of temperature conditions produced by man's agency.

It cannot be said, however, that any sharp cycle of British weather has been established, though many have been suggested. The variation of successive days is usually much greater than that attributable to any cycle. It is, however, of interest to note that Sir Norman Lockyer and Major Lockyer established the existence of a world-wide barometric seesaw between two nearly antipodal parts of the earth, one region about India and its neighbourhood showing exactly opposite effects, as regards atmospheric pressure in any year, to those felt in a region which includes South America and the Southern parts of the United States. A period of about 3.5 years has been found in the mean variation of pressure over these regions. The pressure variations over Great Britain and Ireland year by year do not go up and down with either side of this seesaw, but appear to be a mixture of both types. During some years the British area is enveloped in the pressure system which extends over the large region of which India is about the centre, while for another series it is dominated by the conditions of atmospheric pressure experienced in the region of which South America is the middle portion. On this account the cycle of 3.5 years distinctly exhibited in the meteorological records of two great regions of the world appears in British meteorology at a period of about three years, in the course of which variations are some times very noticeable. An examination of the records of annual rainfall at Greenwich shows this three-year cycle very clearly. Taking a series of years, it is found that two wet years are usually followed by a dry year; but after eight years a reversal takes place, two dry years being followed by a wet one. This peculiar result appears to be due to the combination, in the British Isles, of the Indian and South American pressure systems, which have a definite period of change—one going up while the other goes down—in a period of about 3.5 years.

The general question as to whether there have been decided variations or progressive changes of British climate in historic times is one on which different conclusions have been reached from evidence of different kinds, but exact observations do not exist for a period long enough to settle it definitely. The incidence of famines, and variations of wheat prices, are affected by internal transport and other conditions as well as by weather, and they do not afford, therefore, a sure foundation for conclusions as to climatic change. Dr. Nils Ekholm, in a detailed discussion of variations of climate communicated to the Royal Meteorological Society in 1900 (Q.J. Met. Soc, Jan., 1901) arrived at the following conclusion:—

> " A review of the historical reports during the last thousand years has led, with some probability, to the conclusion that a climatic

> variation is going on from a more continental to a more maritime climate in the north-west of Europe, especially in Scandinavia and Great Britain. The character in other respects, and the cause of this variation, are unknown. We cannot say if the variation is periodical, progressive, or accidental, nor how far it extends in space and time."

The whole matter of climatic change is discussed in detail in two important works published in 1922, namely, "The Evolution of Climate," by Mr. C. E. P. Brooks, and "Climatic Changes: Their Nature and Causes," by Profs. Ellsworth Huntington and S. S. Visher. Space will not permit the consideration here of the various causes of possible variations of climate, such as changes of solar activity, of amounts of carbon dioxide or volcanic dust in the earth's atmosphere, of changes in the obliquity of the ecliptic, of alterations in the distribution of land and water or of land levels, or of effects of changes in the Trade Winds and consequently of oceanic circulation. Authorities differ as to the influence of these factors. While, for example, Profs. Huntington and Visher attribute the English famines of 1315-16 to very severe weather due to external causes, the following Table given by Mr. Brooks shows that severe winters were fairly evenly distributed throughout the whole period from 1075 to 1425, so that the years 1315-16 were not especially exceptional in this respect.

In extension of Mr. Brooks's Table one is given of prolonged frosts in London and the neighbourhood from 1788 to 1895, prepared by my friend, Mr. Charles Harding, to whom I am indebted for the foregoing meteorological statistics, and whose help I most gratefully acknowledge.

SEVERE WINTERS (BROOKS).

Period of 50 years about	No. of Severe Winters.	Period of 50 years about	No. of Severe Winters.
1025	6	1425	13
1075	10	1475	7
1125	15	1525	10
1175	10	1575	14
1225	13	1625	17
1275	13	1675	15
1325	13	1725	10
1375	11		

Prolonged Frosts, 1788-1895.

Date.		Days duration.	Temperature.				Days.		
			Mean Max.	Mean Min.	Mean of Max. and Min.	Absolute Min.	Continuous Frost.	Daily Mean 32° or below.	Max 32° or below.
1788-9	Nov. 16—Jan. 13	49	31°.3	27°.5	29°.4	17°.5	12	33	30
1794-5	Dec. 18—Feb. 7	52	31.9	25.3	28.6	7.0	12	35	23
1813—4	Dec. 26—Feb. 5	42	33.0	21.5	27.3	8.0	11	32	20
1838	Jan. 5—Feb. 23	50	32.9	24.9	28.9	-4.0	13	31	19
1855	Jan. 10—Feb. 25	47	34.8	24.5	29.7	11.1	4	31	15
1860-1	Dec. 15—Jan. 19	36	84.9	24.8	29.9	8.0	3	26	9
1879	Nov. 14—Dec. 27	44	37.2	24.7	31.0	13.7	2	22	6
1881	Jan. 7—Jan. 26	20	31.8	22.1	27.0	12.7	9	14	12
1890-1	Nov. 25—Jan. 22	59	33.5	25.0	29.3	12.0	10	41	27
1894-5	Jan. 21—Feb. 20	31	33.7	21.3	27.5	6.9	7	25	14

Mr. Brooks points out that his Table of Severe Winters shows that "cold winters were especially numerous in the first half of the twelfth century and again in the thirteenth. The end of the fifteenth century was marked by hot summers and mild winters, or a warmer climate; the beginning of the seventeenth century by cold (presumably snowy) winters and cool summers."

It appears, therefore, from this and other evidence, that while there have been abnormal periods of British weather conditions in historic times, there is no decided indication of progressive change either for the better or worse, and that no cycle of practical service can be said to be established though several of academic interest appear to exist.

Annals of Archæology and Anthropology. Vol. X, 1923. University of Liverpool. 188 pp., 26.5 x 18.5 cm. 68 plates. Annual subscription, one guinea. Liverpool University Press, 177, Brownlow Hill, Liverpool.

Among the articles of interest to geographers one may note an article on tablet-weaving by G. M. Crowfoot and H. Ling Roth, with references to weaving in many regions. It reaches the conclusion that no weaving tablets in Egypt are earlier than Coptic times, and even these are of doubtful origin, so that particular type of weaving did not originate in Egypt. Prof. Garstang is specially to be thanked for giving us short articles on the progress of knowledge from publication of Hittite texts; he deals in this volume chiefly with the place names used in Hittite Political Geography. Readers of Prof. Macalister's well-known little book on Palestine (Cambridge Manuals) will welcome C. L. Woolley's account of Jebeil, with pottery, etc., like the finds at Neolithic Gezer. A long and richly illustrated account of finds in about 1,550 graves, apparently mainly of the time of the XXVIth Dynasty, adds much to the knowledge of Ancient Nubia.

"BARBADOS—A KEY TO THE PHYSICAL HISTORY OF THE WEST INDIES AND CARIBBEAN REGIONS."

A. N. WILMORE.

(A Lecture given before the Westminster and Central London Branch of the Geographical Association, January 29th, 1924).

BARBADOS is comparatively well known ground, claiming a history of over three hundred years' unbroken connectoin with the Empire. Associated with the island are the names of many great workers and writers, and mention need only be made of such as the two Agassiz, father and son, Sir R. Schomburgk, Professor J. B. Harrison, the late Mr A. J. Jukes-Browne, and Dr. J. W. Gregory, to realise that there can now be no exploration in the more ordinary sense of that word. Present day exploration must be such as is understood, for example, by the oil-technologist, when practically no detail of Geology and Topography is too small to be overlooked. This account does not attempt any contribution of moment to our knowledge of the island; rather is it an endeavour, based upon some three years spent in the detailed survey demanded by oil-exploration, to present the Geology of the island in a concise form, sketching in the broad outlines of the Physical History deduced therefrom, and applying these, where possible, to the wider area included under the general title—"West Indies and Caribbean Regions."

The whole area under discussion lies well within the Tropics, the southward extent of the sketch-map (Fig. 1) being about 5 degrees North latitude and the Tropic of Cancer running a little to the north of Cuba, the largest island of the West Indian group. The intermediary position of Central America and the West Indies between the two great land masses of North and South America is common knowledge, but it should be noted more particularly that this position is somewhat oblique, a fact which is most graphically realised by considering a north and south line through, say, New York. Such a line leaves practically the whole of North America to the west, passes approximately across the middle of the Caribbean Sea, and leaves almost the whole of South America to the east. This obliquity of the three great World Regions—North America, Central America and the West Indies, and South America—is of considerable importance.

Barbados lies wholly between latitudes 13 and 13½ degrees North, and is situated on the extreme eastern fringe of the West Indian group, being approximately 80 miles east of St. Vincent, the nearest of the Lesser Antilles, which may be regarded as being in the main chain of the islands. With maximum length and breadth of 21 and 14 miles respectively, it has an area of 166 square miles, comparing roughly in its dimensions with the Isle of Wight. That so small an island should be expected to furnish any "key" to the structure of so large a region might appear, at first glance, somewhat unlikely, but a fairly safe parallel may be drawn from the "key" position held by Barbados *geographically*. As a coaling station, a cable station, and a potential oil-bunkering station, it has considerable importance, the position making it a "first port" for vessels from the Old World and an obvious "port of call" for Lines operating between North and South American ports. As a result, it is an important point of transhipment for passengers and cargo for many of the other islands.

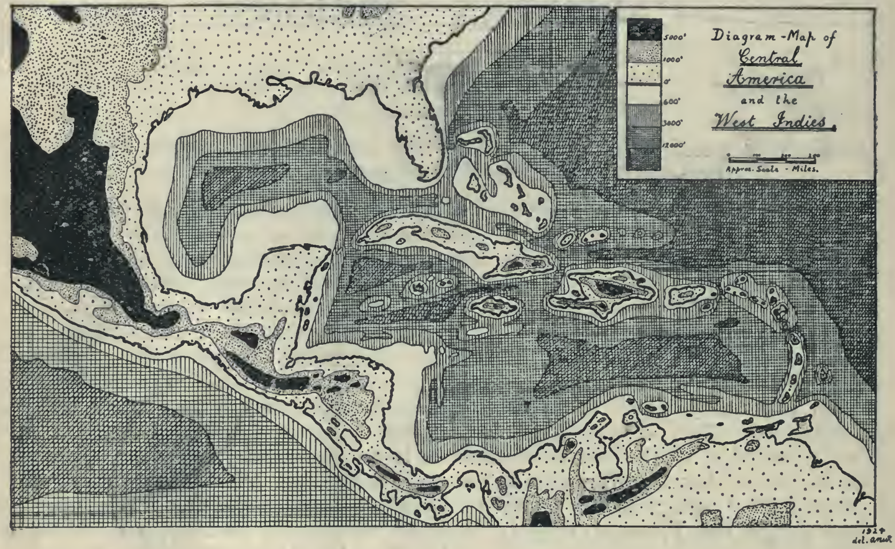


Diagram-Map of Central America and the West Indies.

Diagram-Map of

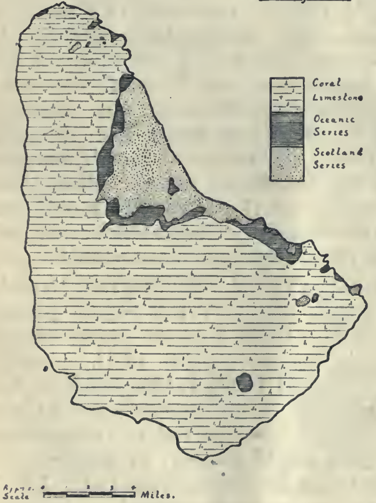
Barbados, B.W.I.

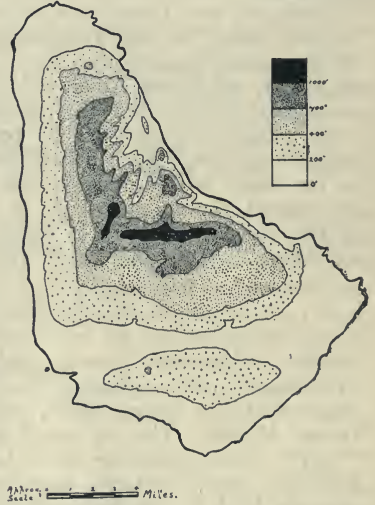
Geological.

Diagram-Map of

Barbados, B.W.I.

Relief.





The almost invariable point of approach is Bridgetown, the capital and only large town (pop. 13,500), situated to the extreme south-west of the island and in Carlisle Bay, which forms the only possible harbour for liners and the only careenage for schooners. This harbour is an open one, but has sufficient natural protection from the north-east trade winds, and is safe except during hurricane periods. From whatever direction the harbour is approached, two features compel attention; the unusual distance from the shore of the outer line of breakers, due to the presence of the coral reef which surrounds the greater part of the island, this distance being roughly one-third to half a mile, or even more; and the apparent gentle rise of the land from the shore in every direction towards the middle of the island.

However interesting a first acquaintance with Barbados may be, it is none the less distinctly unpromising from the point of view of the oil-geologist, for in every direction are to be seen natural exposures, road cuttings and excavations for building and road material, all in the same soft coral limestone, and it is not until investigation is made of parts of the island lying farther afield that any clue is obtained to phases other than the most recent, or coral-building phase, as it may be termed.

On the diagram map of the Relief of the Island (Fig. 2) a number of chosen contours are sketched, sufficient to show the main topographical features. It will be seen that in the southern part there is a subsidiary ridge of east-west trend, barely attaining a height of 400 feet, and separated from the main or northern portion of the island by a long valley, and it is clear that a depression of the whole island of 200 feet would effect a connection of the sea through from east to west. The main or northern part of the island appears to rise evenly from north, west and south to the highlands of upwards of 1,000 feet in the centre, this rise actually being achieved for the most part by a series of terraces.

The outstanding feature of the topography is the concave coast of the north-east, with a corresponding but much more accentuated curve of high land which stands as a great escarpment overlooking the north-eastern bay of land, in which, as the contours indicate, the surface is very sharply dissected into a series of acute ridges and clean-cut valleys, generally converging and opening out towards the north-east. In addition to this main drainage system, and separated from it by a hill which rises abruptly to nearly 1,000 feet, there is an independent valley draining the southern portion of this " land bay," whilst from this valley there runs a strip for some miles to the south-east, in which there are many precipitous descents, a fall of 700 feet and more being accomplished in an average distance of about one mile. The north-eastern area, thus sharply dissected, owes its characteristics to a very great extent to the intensity of the tropical erosion acting in the direction of the north-east trade winds, which blow so consistently and steadily over the region.

This area is generally known as the " Scotland District," a name presumably given to it, owing to its similarity to the Scottish Highlands on a miniature scale, by the Scottish Loyalists deported to Barbados as " White Bondsmen," in the early days of colonization, and it is interesting to note, in passing, that in the Scotland district are still to be found many " White Natives " with flaxen hair and blue eyes, the descendants of the " White Bondsmen," still dragging on a miserable existence in almost the last stages of degeneration, brought about by attempting to live under tropical conditions on the same terms as their negro neighbours.

In this Scotland district lies the " key " to the geological structure of Barbados and to its Physical History, for here are found deposits of an entirely different nature from the coral limestone which covers so much of the island. Sir R. Schomburgk (" History of Barbados," 1848) differentiated between the Coral cap and the deposits underlying it, giving to the latter the name " Scotland Series," a name still retained for some of the beds; but he failed to differentiate a third series, intermediate between the Coral cap and the lower beds, for which his name is still retained. The recognition of this intermediate series is due to Professor J. B. Harrison and the late Mr. A. Jukes-Browne (1889) working in conjunction, and their name, the " Oceanic Series," is still adopted. The generalised geological map (Fig. 3) serves to show the outcrop of the three series, and it is interesting to note the striking correspondence with the relief as seen in Fig. 2. The three series—the Scotland series, the Oceanic series, and the Coral cap—are described in ascending order of occurrence.

THE SCOTLAND PERIOD.

The Scotland series consists of a great sequence of sands of all degrees of cohesion, from loosely compacted sands to hard sand-stones, and varying from extremely fine-grained deposits to coarse conglomerates, and sandy clays and fine clay-shales. Originally estimated by Professor Harrison and Mr. Jukes-Browne to have a thickness of 550 to 600 feet of beds exposed, this estimate may now be fairly safely increased to well over 3,000 feet, as a result of careful mapping and from additional information obtained from drilling activities, whilst the base is as yet unknown. That the Scotland beds extend throughout the island is undoubted, conclusive proof of this being furnished not only by the drilling for oil but by the large number of wells which have been sunk for water and by the isolated inliers exposed as shown on the map, Fig. 3.

There is a remarkable rapidity in the vertical variation of the beds, in the alternating sequence of sands and clays, and also an equally remarkable lateral variation, beds of sand thinning out or passing into clays or clay-shales, or existing as lenticular patches or " pockets." Many of the strata are petroliferous, ranging in the nature of their products from very high grade, light oil, to the hard, black pitch known as " Manjak." All the beds show a vast amount of folding throughout the area, and a considerable amount of faulting, and it is important to note that most of the movement thus evidenced is not reproduced in any overlying series, and that complete unconformity exists between the Scotland beds and the Oceanic series, the latter lying on every known phase of the former.

In a few scattered localities within the Scotland district occur patches of an interesting and somewhat important deposit, not differentiated on the map, one of the chief occurrences being centred round the independent high ground mentioned in a foregoing paragraph as separating the more southern valley from the rest of the Scotland area, whilst another patch is centred around the more westerly strip of high ground in the middle of the island (Fig. 2). This deposit consists of angular masses of clay and shale, compacted together and including irregular " boulders " of practically every known sandstone occurring in the Scotland series, all the sandstone " boulders " being heavily oil-impregnated, and each occurrence of the clay breccia resting unconformably upon the true Scotland beds beneath.

Physical History.—The nature of the strata of the Scotland series makes it clear that, at the time of their deposition, there must have been a considerable land mass undergoing denudation in the neighbourhood, and the vast deposits of quartz sand would appear to indicate mountains of hard rock. As many of these sands are very coarse, in some instances grading into coarse conglomerates, deposition cannot have taken place far from land, and must, in fact, have been on the margin of the land mass, whilst the great lateral and vertical variation of the strata points to something approaching fluctuating deltaic or estuarine conditions, with changing currents and channels and periodic flood times. If the theory as to the formation of petroleum from embedded, decayed vegetation is accepted, the petroliferous nature of the Scotland series gives support to these deductions as to their mode of deposition.

Formations corresponding broadly to the Scotland series are to be found in Trinidad and other islands of the Lesser Antilles, and with a great degree of probability in Cuba and Venezuela; there is good reason, therefore, for reconstructing some old Caribbean land mass, or, possibly, the hypothetical continent of "Antillia"; the geography of the Caribbean region was undoubtedly very different from that of the present time. As regards the actual age, the evidence furnished by the Scotland beds is neither very plentiful nor very definite, but such as does exist makes it fairly safe to refer the series to Upper Eocene or Lower Oligocene times.

Subsequent to the period of deposition of the Scotland sands and clays there must have been a period of uplift, succeeded by prolonged sub-aerial denudation of these deposits; this is necessary to account for the complete unconformity between the Scotland beds and the overlying series. During this period of sub-aerial denudation it is highly probable that many great "mud volcanoes" dotted the surface, for the occurrences of the clay breccia, already described as lying unconformably on the Scotland beds, have every appearance of having been formed in this manner, accompanied or caused by the escape of gas and oil, resulting in the agglomeration of "boulders" from the different strata underneath. The cones of known extinct mud volcanoes of Trinidad are filled with similar clay breccia.

THE OCEANIC PERIOD.

The Oceanic series occupies a position intermediate between the Scotland beds and the Coral cap and outcrops, broadly speaking, as a belt between the two, as is shown on the generalised geological map (Fig. 3). There is one main outlier occurring on the isolated high ground in the south of the Scotland district, in addition to which there are a number of smaller outliers, chiefly on the higher tracts of ground in that area; there are also a number of small inliers in the rest of the island, which is more generally covered by the Coral cap. The recognition of these beds, and the realisation of their great importance, are due to Professor J. B. Harrison, late Island Professor of Chemistry in Barbados, and the late Mr. A. J. Jukes-Browne, of the Geological Survey of Great Britain.

The base of the Oceanics, as has already been pointed out, lies unconformably on the upper surfaces of the Scotland beds, and in many places the former are faulted down amongst the latter. Although the acute folding seen in the Scotland series is not reproduced in the Oceanics, the latter show a system of more gentle folding, which, although it must of necessity be superimposed on that of the Scotland beds, is not sufficiently great to modify the latter to any serious extent. The upper surface of the Oceanics is very irregular, as is also the thickness, and in some areas, for example, where the inlier of Scotland beds is shown to the north of the map, the Oceanics are missing and the Coral cap rests directly on the Scotland series. The greatest exposed thickness is 300-350 feet, in the locality of the highest ground in the middle of the island, but there are probably greater thicknesses to the south and east, where the base of the beds is not exposed.

It is the nature of the beds, however, which provides the greatest general interest; they consist of a series of white and yellowish, soft, chalk-like earths and marls, with a few compact, hard limestones. The white earths are highly siliceous, and consist almost entirely of the remains of Radiolaria, with a few Diatoms; the siliceous earths grade into marls which contain numerous Foraminifera, and into highly calcareous, yellowish marls which are made up almost entirely of Globigerina, with a mingling of numerous other forms. Broadly speaking, the sequence is from thin, calcareous, hard limestones at the base, through much greater thicknesses of the siliceous earths and calcareous marls, to thinner limestones again at the top, but, as already indicated, the Coral cap may rest upon any phase or upon the Scotland beds themselves.

Physical History.—In order to gain the full significance of the Oceanic series, it is necessary to appreciate the evidence furnished by the Radiolarian and Foraminiferal deposits. Stated quite briefly, and taking the general concensus of evidence and opinion, Radiolarian oozes are characteristic of depths of about 2,000 fathoms or more, and are peculiar to Pacific waters, whilst the Foraminferal oozes indicate depths of a general average of about 1,000 fathoms, and are not limited to Pacific waters, being found in Atlantic depths also.

The period which intervened between the formation of the Scotland and Oceanic series has already been discussed in the light of such evidence as is available; this intervening period must have closed with a profound subsidence, as the nature of the Oceanic deposits indicates, and that this was fairly rapid may be inferred from the inconsiderable thickness of the calcareous limestones which occur below the siliceous Radiolarian deposits, whose formation at true oceanic depths is implied in the general name given to the whole series. The peculiarity of these Radiolarian oozes to Pacific waters appears to indicate free connection between that ocean and the depths in which the Barbadian deposits were formed. Additional evidence of such connection has been drawn from the similarities existing between the faunas of the Caribbean Sea and the Pacific Ocean at the present time, whilst the differences between the fossil faunas of North and South America of immediately preceding times lend support to the separation of the two continents.

That the formation of the "oceanic" deposits should be restricted to a small area, now represented by Barbados, would appear, at least, improbable, and without going into close detail, it will be sufficient to indicate occurrences of broadly corresponding deposits in other parts of the great area under discussion. Trinidad, Cuba, and Jamaica all show such deposits, and it is quite possible that fuller investigation will reveal others. The history of the Scotland period closed with a phase of subaerial denudation, and it is impossible to say how long elapsed between the formation of the highest Scotland beds and the lowest of the Oceanics; but it is fairly safe to infer that there succeeded a period of profound subsidence effecting a great part of the Caribbean region, and that there was open communication between the true oceanic depths thus formed and the present area of the Pacific, for a part of the time, at least. The Oceanic deposits can generally be referred to Miocene times, and it appears quite possible that the depression of areas to the east of the Caribbean region was accompanied by or contemporaneous with the uplift to the west which resulted in the connection of North and South America.

THE CORAL PERIOD.

The Coral cap, which covers approximately five-sixths of the island, is nowhere of great thickness, seldom exceeding 260 feet, and more usually between 150 and 200 feet. The consistency varies very considerably, from a rubble of coral sand, broken coral fragments and marine mollusca, to masses consisting almost entirely of colonies of branching corals. The limestone does not overlie the " inner core " of the island as an even sheet, but rather as a series of stages or platforms, and, as already mentioned, the ascent to the middle of the main part of the island is made chiefly by a series of steps or terraces.

Physical History.—The period of deposition of the Oceanic series must have been succeeded by one of uplift, bringing those beds within the zone of submarine erosion, thus accounting for their very irregular upper surface. As this uplift continued the Oceanics would eventually come within the depths at which the coral polyps could build, and the first platform or reef would be formed, this reef subsequently being the first " land " to emerge above sea level. It will readily be seen from the relief map (Fig. 2) that the main or northern portion of the island must have appeared first, whilst at every stage of the elevation there would be the surrounding or fringing reef still in process of formation. When the reef which is now at an elevation of approximately 400 feet, appeared above the surface of the water, there must have emerged also the subsidiary small island to the south, and, the upward movement continuing, the two islands eventually became united, with one common reef fringing the whole, as it does at the present time. The exceptional absence of the Coral cap and the fringing reef to the north-east is readily explained; when the island first appeared above water, it would be subjected to the intense erosive forces acting in the direction of the north-east trade winds; as these removed the protecting cap and exposed the clays and sands which underlie, an immature drainage system towards the north-east would be set up and tremendous quantities of mud would be carried into the sea during the rainy seasons—a phenomenon frequently observed at the present time, when, for days at a stretch, after a heavy downpour, the breakers present a yellow, turbid appearance. This would prevent existence of corals along that part of the shore, and it is highly probable, from this reason, that much of the north-eastern area has never carried the Coral cap.

Where the fringing reef is actually building, it is subject to the wearing action of the sea, and all around there accumulates a bank of debris upon which, with subsequent elevation, a newer reef will be built. This accumulation of coral debris is sufficient to account for any thickness of the Coral cap in excess of 180 feet, which is the approximate range of existence of the coral-building polyp.

This period of uplift in Barbados is represented throughout the Antilles by the reefs which occur from one end to the other, as raised reefs in the islands and as submerged reefs on the many banks in the shallower parts of the sea, and the resulting topography is seen in Fig. 1. Some idea of the titanic scale of this submarine topography may be gathered when it is noted that a height of over 10,000 feet above sea level is attained in San Domingo, whilst less than 300 miles away in a north-westerly direction, in the Brownson Deep, depths have been recorded of more than 27,000 feet—a difference in elevation of more than 37,000 feet in a distance of less than 300 miles. Other comparisons will serve to show the magnitude of the uplifts and depressions of the region.

The obliquely intermediary position of the whole area between the land masses of North and South America, and the more general east and west trend of the Caribbean uplifts, may well have a close relationship to the fact that the north and south trends of the Pacific Cordillera of North America and the Andean Cordillera of South America would not meet by some 1,000 miles; and it is probably not without significance that along the eastern and western margins of this intermediate region are to be found the Antillean and Central American lines of vulcanicity.

TRANSYLVANIA: A GEOGRAPHICAL STUDY

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TRANSYLVANIA is a country of plains surrounded by mountains, and and its streams are apt to pierce the mountain belt in deep and picturesque gorges instead of descending towards the plains. The mountains, instead of showing, as one would expect, more and more ridged forms towards the summits, terminate, at altitudes of 2,000 metres and more, in undulating uplands, where one has the impression of standing on a rolling plain. Transylvania is one of the regions of mixed races so characteristic of Eastern Europe; and towns often have three names—that of the atlases, usually German; that known to the peasant, which is Roumanian; and that of the railway station, Hungarian; and these three names are as different as Hermannstadt, Sibiu, and Nagy Szeben.

In spite of centuries of continuous possession by Austria or Hungary, Transylvania was the cradle of Roumanian independence, but its union with the kingdom of Roumania, while a legitimate satisfaction for the Roumanians, raises extremely delicate problems. It is rather with the problems of physical geography, however, that this article will deal.

If we could raise ourselves high enough to embrace all Transylvania in one glance, it would appear to us a sort of basin, suspended above the neighbouring plains—the Hungarian plain or plain of the middle Danube on the West, the Wallachian plain of the lower Danube on the South, the Russian and Moldavian plain on the east. The elevated margins of the basin are formed by high mountains of the same origin as the Alps—the Carpathians proper at the east and south, the massif of Bihor at the west. The hypsometric map will give you an idea of the general topography. The rivers Olt, Buzev, and Jiv, rising in the basin, pierce the mountain border to gain the lower Danube at the south; the Mures, the Crish and the Somes, to reach the Tisza at the west. To complete the picture, imagine the sombre tints of forest covering the mountains, the light green or yellow of the fields and pastures spreading afar in the centre of the basin, with white spots revealing towns and villages, and you will have some appreciation of the fundamental contrast in the physical and human geography of this country, where the mountains of the border and the hills and plains of the centre form a striking contrast from every point of view.

There are few places in the region of the hills from which the greater heights are not visible. Many summits surpass 2,000 metres, some even 2,500 metres, and this suggests a range of alpine ruggedness. But the silhouette is usually as uniform as that of the Vosges in France, or that of the Highlands of Scotland. The road which follows the valley in order to traverse the mountain enters a narrow gorge in ancient rocks, cristalline schists, gneisses or even granite. The geographer is struck by the vigour of the erosion, the rapids or cascades, the steep valley walls with prominent rock ledges, all the characters of a young valley in process of rapid deepening. It is by very steep trails that we climb towards the heights, in order to experience the surprise of coming out upon an upland, where the journey immediately becomes easy. Old waggon-roads traverse the upland surfaces which the Roumanian peasant calls by a common name signifying road—*"Plaiuri."* Upon one of these "Plaiuri," in the massif of Poiana Ruska, one cannot fail to be struck by the steepness of the valley slopes and the uniformity of the upland levels, which latter seem to merge in the distance in a great plateau, reaching 1,400 metres above sea level.

In the Bihor massif Cucurbeta attains 1,800 metres, and the tree limit stands at about 1,700 metres. Most entries to the system show steep sided valleys, sometimes separated by narrow, castle-crowned ridges, leading up to remnants of a high plateau (Fig. 1), on which the rivers have large open valleys, while the summits stand at remarkably similar levels. On the western side this mass appears to break off abruptly, giving the impression of a dislocation, like those which frequently affect old mountains. As a matter of fact, the Carpathians represent a chain of Tertiary folds, like the Alps; but in form they resemble rather the Hercynian massifs, that is to say, mountains formerly levelled by erosion, and later sculptured again by the rejuvenated streams, awakened to new energy by pronounced changes of level. The monotonous uplands, which we have observed, sometimes really unite to give veritable undulating platforms, which bevel across the most complicated geologic structures. Even at the higher summits (Boresco, 2,200 metres), save for fractured rocks and sparse vegetation, one might fancy oneself on the slope of a low hill; one may speak of the Boresco platform.

By means of long and detailed studies on the ground, it has been possible to establish the existence of several series of platforms, corresponding to ancient periods of prolonged erosion in the mountains known as the Transylvanian Alps, and to indicate the extension of these platforms upon a map. The Boresco platform includes the high summits, and is faintly undulating. It is all that remains of a vast extent of mountains, reduced by erosion to a plain of low relief. On it are hills rising some hundred metres above the general level; these are to-day the crests which sometimes attain altitudes of 2,500 metres. This ancient surface must have been dislocated by movements of the earth's crust; but since this happened, erosion has had time to fashion another platform, in large part at the expense of the ancient uplifted surface. It is this platform which to-day is preserved over the greatest extent of country. I have called it the *Riu Ses platform.* The " Plaiuri " are in considerable measure the remains of this surface, cut into fragments by stream erosion following new movements of the crust. The most widely extended platform is of Miocene age, that is to say, that it was eroded by rivers emptying into the seas or lakes which, at this epoch, spread over the present basin of the Danube. Recently the study of the Bihor has enabled me to fix exactly the age of the highest and oldest platform, which declines to the level of the foothills and disappears under the deposits of the Eocene sea. Sometimes it declines regularly, sometimes it is broken, and sometimes it is warped.

LIMESTONE.

If the mountain uplands are in general quite uniform, we must attribute this in part to the rather homogeneous rocks in which erosion has worked. Sedimentary formations containing limestone-beds are much more rare than in the Alps. Where they do occur, the relief is of an exceptionally picturesque aspect. Thus the eastern border of the Bihor affords some views recalling the Jura or the Pre-Alps. The limestone barrier dominating the pretty village of Torosko, concealed amid its orchards, is truly most impressive. The contrast of these bold scarps with the verdant slopes of sandstones covered with woods and meadows, gives a more varied landscape, but here again the forms are sculptured in an older monotonous surface. There are in the Bihor some stretches of high limestone plateaux, where the subterranean erosion is almost alone active, creating forms characteristic of the karst. The little dolinas of Tomasca are of almost diagrammatic clearness. There the rivers are lost in closed depressions, or open for themselves caverns and pits, into which the waters escape. One sees them reappear at the base of high scarps, half concealed under the mantle of the fir forest, to meander through a meadow, only to disappear once more underground. Such a brook in springtime may inundate the entire basin through which it flows, transforming it into a lake.

GLACIERS.

It is rare, however, that the limestone beds constitute the most elevated portions of the Transylvanian mountains, and it is to another cause that the highest peaks owe their forms, which are sometimes very picturesque. During the Quaternary period, when the glaciers of the Alps descended to the plains, and the Scottish Highlands were covered with a sheet of ice, the high valleys of the Carpathians (where in summer we still quite often find fields of snow) witnessed the formation of glaciers comparable with those found in the Alps to-day.

The study of the traces of these ancient glaciers of Transylvania involves exploration of a wild country, the very existence of which is unsuspected so long as one remains in the region of the plains or platforms. In that wild country are great cirques gnawing into the upland surface, lakes not marked on our maps, roches moutonnées and moraines. The massifs most remarkable for picturesque forms due to the ancient glaciers are the chain of Fogarash and the Retezat. The high valley leading up to the Negoi, the highest summit of the Transylvanian Alps, calls to mind truly Alpine landscape with its rounded through profile, and the abrupt descent of the tributary valleys. It is through a fantastic chaos that we attain the gap of Bucura in the Retezat. We look down on one side into the glacial valley of Petrile, encumbered with moraines and rock slides; on the other into the great cirque of Bucura, and its lake, which, like a shining mirror, glitters in the midst of the dark wilderness of mountain pines, partially covering the grey and ruddy rocks. This is the largest lake of the Carpathians. The high glaciated massifs with their cirques and their lakes, the masses of limestones, in places bordering the mountain and cut by narrow gorges, constitute the charm of the Transylvanian Alps. But the more ordinary landscape is that of the monotonous upland levels, separated by deep valleys. This landscape is not lacking in beauty, or at least in grandeur, when it forms extended vistas of wooded crests stretching along the horizon in changeless monotony. In any case, the characteristics of the relief must not be forgotten, if one would understand the conditions of life in this region. The mountains are less populated than the Alps, although appreciably less elevated. Furthermore, although situated in a region of mixed ethnic stocks, they are inhabited almost exclusively by Roumanians. Save among the glaciated massifs, forest covers the slopes. There are in the Transylvanian mountains apparently inexhaustible supplies of wood. I have seen here nooks of real virgin forest, where the great firs, dying of old age, fall across the abandoned trails. Whether you follow the bottom of the narrow valleys, where dash the wild torrents, or whether you climb up the steep valley walls, you are always in the forest solitude. But you often find villages and fields above, upon the uplands of the "plaiuri," those regular crests, sculptured by erosion from ancient surfaces. Thus in the Bihor, for example, the commune of Marisel spreads its fields and rears its houses for a length of 20 Kms. at an altitude of 1,000 to 1,200 metres. The mountaineer prefers, in place of the shade of the deeply entrenched valley, the sunnier uplands; in place of the steep and rocky slopes, the upland crests, where movement is easy, and where the residual soil from rock decay is fairly deep. He builds his house, with roof of thatch or of wooden laths, in some low sag of the upland. He takes advantage of the favourable exposure to cultivate his fields upon the sunny slopes. In the east-west valleys, the contrast between the slope exposed toward the south and that facing the north is not less marked than in the Alps. In France we give the name *adret*, or *right* *side* to the sunny slope, and *ubac* or *wrong side* to the slope in the shade. The Roumanian peasant says "*fata*" and "*dosul,*" that is to say, the *face* and the *back*. At Vadu Dobri (Fig. 5) is seen on the right, the *back*, sombre and quite covered with firs; on the left, the *face*, its fields and meadows, sprinkled with little Roumanian houses built of wood. We are here at an altitude of more than 1,200 metres. At this elevation, the ground is covered with snow during several months, and agriculture is precarious, even in those spots exposed to the sun. Here stock raising plays the principal rôle in the rural economy. Higher up, permanent habitations disappear, and pastoral life during the summer alone animates the vast stretches of meadows, which extend above the limit of forest. The shepherds' huts, called "stîne," resemble the mountain houses. Their inhabitants are exclusively Roumanian. One must have lived with these primitive people in order to understand the past of the Roumanian race, and how it was preserved in the mountains, practically unknown to the chroniclers, during the period of the barbarian invasions and the troubles of the Middle Ages. You will notice the walls of a stîna are built of great fir trunks, and the roof of laths; it is without chimney. The smoke gets out as best it can. The pot is curiously suspended from one of the cross beams. The fire of great chunks of wood duly roasts the part of your body which you present to it, the opposite side remaining quite frozen, while the smoke makes you weep copiously.

They are fine but simple folk who live here. It is often impossible to get them to accept anything more substantial than a bit of tobacco for a hospitality, which is rustic, to be sure, but none the less truly cordial. The cioban (shepherd) is picturesque, with his fur bonnet (caciula), his long hair, his waistcoat of skin (pieptar), his leathern belt, his cloth trousers, and his sandals of raw hide. The married women wear a sort of turban; the young girls are bareheaded.

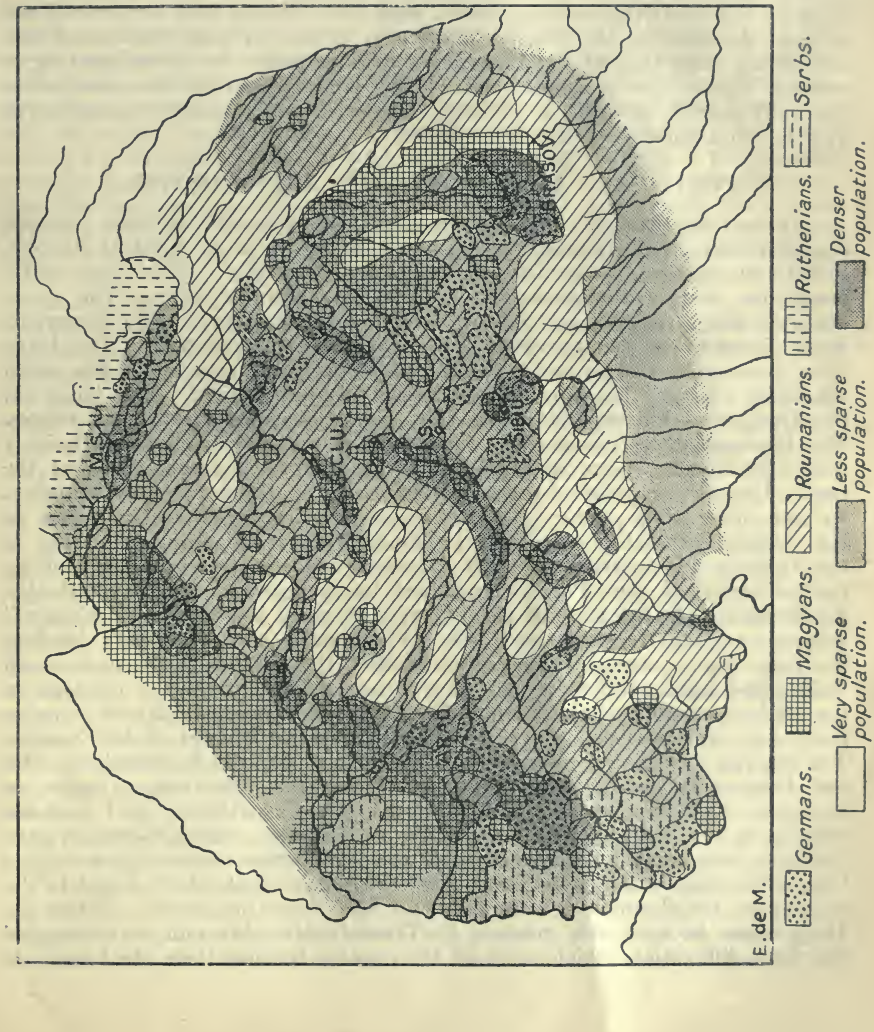
At a wedding we have the bride and groom united to their witnesses by a symbolic scarf, and flags are carried by two young relatives of the couple, and they must not be laid aside even for the dance. These are glimpses of the archaic character of this mountain life, a life which is purely Roumanian. Its localisation upon the uplands, even in the zone of permanent habitations, is the consequence of the topographic features, of the narrowness of the young valleys incised in the ancient erosion platforms, which form the crest of the "plaiuri." This is well proven by the fact that, where less resistant rocks have permitted the widening of the valleys, the villages know well to take advantage of the favourable terrain. The peopling of the heights is, nevertheless, generally characteristic of the Roumanian mountains. This has not escaped the attention of Hungarian geographers, and I recall that one of them has ingeniously taken advantage of it in publishing a work, apparently scientific, which not long since was widely distributed for purposes of propaganda. This savant very justly pointed out that ordinary ethnographic maps convey false ideas, because they distribute the colour, designating a given nationality, with equal strength in regions much or little inhabited and even in regions uninhabited. He concluded from this that it would be better to leave the mountain areas blank. The contour of 800 metres was chosen as the limit of the inhabited zone in Transylvania; and, as many Roumanian villages are found around altitudes of 1,000 metres, the result was truly marvellous—the map showed a Transylvania where the Roumanians seemed to count for very little.

The interior region contrasts strongly with the mountain girdle from every point of view. Instead of a very rugged country, forested and pastoral, with a population widely disseminated and purely Roumanian, we have a country of plains or of hills, de-forested and agricultural, with a population very much mixed, grouped in large villages and small towns.

The relief, which appears insignificant when one sees it from the mountain heights, reveals itself as fairly pronounced, but truly monotonous when one traverses the country. From the great square in Cluj, at an altitude of 340 metres, one sees rising above the roofs of the houses the summits of hills attaining 750 metres. The horizon is always formed by fairly uniform elevations. When one rises to some culminating point one finds the remnants of the ancient surface, in which the development of a network of ramifying valleys has sculptured the present topography. At certain points it is possible to recognize the correspondence of this surface with one of the ancient erosion platforms of the mountain, and the enigma of rivers cutting through the girdle of highlands surrounding the Transylvanian basin seems suddenly to find a solution. The Olt, the Jiu, the Buzeu, and the others, have had good reasons for doing what appears, at first sight, to be a defiance of nature. When these streams first took their course across the walls which now seem to us impassable, these forms did not rise as high as they do to-day above the Transylvanian basin, and the ancient erosion surfaces, which we have recognized in the mountains, formed in some places low and rather broadly open saddles. At the same moment the plain of the lower Danube was undergoing a subsidence. These conditions are seen in Fig. 1. It is easy to understand how the vigorous river, flowing down a fairly pronounced slope on the outer side of the Carpathians, has found it possible, by headward erosion, to undermine and deflect a river in the Transylvanian basin. Fig. 2 shows the result of this capture, the arrows indicating the directions in which the waters flow. The conquering river has pursued its advantages in the interior of Transylvania, and the streams, which it leads towards the base level of the lower Danube, have been compelled to incise their valleys deeper and deeper, thus creating the forms which we now observe: broadly rounded hills, widely open depressions. It is easy to understand, when traversing the country of interior Transylvania, how this modelling of the relief has been able to develop rapidly. Nowhere does one see hard rocks, but only sands and clays, sometimes with lenses of salt deposited by the seas, lagoons, and lakes of the Neocene epoch. In these weak formations the valleys ramify indefinitely, and soon widen by landslips and earthfalls from the valley walls. In the vicinity of Cluj the Sarmatian sands contain rounded masses of sandstone, which form ramparts, resembling the ridges of frontal moraines. Thus was fashioned an undulating country, easy to traverse along the principal valleys, readily lending itself to agriculture, particularly on the alluvial terraces of the plains; sufficiently rugged for the hilltops attaining 750 metres to retain patches of woods, and for the slippery slopes to be abandoned to pasturage.

THE POPULATION.

The population is here naturally more dense than in the mountains, and the distribution of the people affords new contrasts. No longer do we find villages stretching from 10 to 20 kilometres; the habitations are grouped, although in a manner which differs according to the terrain and according to the nationality. The typical Hungarian village has its houses in orderly alignment along the two sides of the principal highway, toward which all present the gable end of a roof, which is very characteristic. These villages occur in the great valleys, where the fields stretch over the alluvial terraces. The only compact group of rural Hungarian population, that of the Ssekler, is found in the eastern part of Transylvania, where the Olt traverses a series of broad basins. These are military colonies, which were established in the Middle Ages by the Hungarian Princes, and which have prospered upon a soil recalling in some degree that of their original plain. The Hungarians are especially numerous in the towns, where their proportion was constantly augmented during the nineteenth century by the assimiliation of a part of the Roumanians, who came in from the country, and by the influx of Magyar functionaries and merchants. The Germans are also town dwellers. They form a rural element only in the southern part of Transylvania, where the Saxon villages alternate with the Roumanian villages, being distinguished from the latter by their orderly, rich, and prosperous aspect. They have founded or developed the greater number of small towns, such as Schäfsburg or Seghisora, with its vineyard and its hill, where the church and the high ecclesiastic buildings dominate the scene. Hermannstadt deserves its other names of Sibiu and Nagy Szeben because of the part which the Roumanians and the Hungarians have played in its development, but the centre of the town preserves the stamp of the little old Germanic city. The same is true of Brassov. Outside of the towns the great mass of the population is Roumanian. In general, one may say that it is almost exclusively so in the vicinity of the mountains. The Roumanian village can be recognized by its houses scattered capriciously in the midst of orchards. Their form recalls the stîna or the mountain house. The roof



is in four sections, often covered with thatch, sometimes with laths. It protrudes, supported by posts, to form a porch. It is a type also found as far as Bessarabia, with the curious sculpturing of its columns. In the Roumanian village of the plains the house sometimes adopts the style of the Saxon or Hungarian dwelling, the roof in two sections, with gable facing the street. But the covering is often of thatch, and there is always more caprice in the grouping of the habitations. Most frequently the Roumanian villages avoid the large valleys. You may pass through such a valley without suspecting the existence of a village. It is somewhere near the head of a tributary ravine, concealed by some fold in the earth, very high up near the summits, at the margin of the forest which crowns the hills, and which seems to be prolonged by the orchards, in which are scattered the houses. The peopling of a portion of Transylvania by Hungarian and German colonies has certainly been due in part to the abstention of the Roumanians, who, through long centuries of insecurity, have become accustomed to avoiding those regions too easily accessible. The ethnographic map shows the result of these migrations. An attempt has been made to represent the real conditions, that is to say, to take account of the unequal densities of the population, but by a process more exact and less misleading than that of the Hungarian map of which we were speaking a moment ago. The predominance of the Roumanians in the mountains, generally scantily peopled, is evident. The medley of races in the interior of Transylvania appears at the first glance.

POLITICAL AND ECONOMIC DIFFICULTIES.

It is true that the inconveniences of the ethnical situation became manifest only in the nineteenth century. Here, as in all Central Europe, social and religious distinctions alone counted formally. There were serfs, bourgeois, and lords; orthodox, protestants, and catholics. The great mass of the serfs was formed by orthodox Roumanians. The bourgeois were Germans or Hungarians, either catholic or protestant. The lords were Hungarian and catholic. The Roumanian, who rose above his social condition, changed his religion and forgot his nationality. John Hunyadi, the Hungarian Prince, victor over the Turks, was of Roumanian origin. The Roumanian serfs sometimes revolted, but these uprisings were quickly stifled in blood. A certain number immigrated toward the plains of the lower Danube, especially toward Wallachia, a Roumanian principality. In the nineteenth century a curious event transpired. The idea of Roumanian nationality was born in Transylvania, and through an act of the Austrian administration. Catholic propaganda had succeeded in making the authority of the Pope recognized by a portion of the orthodox Roumanians. In the hope of gaining new recruits, some young "Uniate" priests were sent to study at Rome. The contact with Italy was dazzling to these young men. They perceived that they could easily understand Italian and Latin, and that their tongue was a Latin tongue, a heritage of the ancient masters of the world. They returned home, filled with a naïve pride, proclaiming themselves the descendants of the colonies of the Emperor Trajan, and determined to awaken from their torpor the Roumanians, who had been serfs during long centuries. Soon the Government began to consider them dangerous. They crossed the Carpathians, and founded schools in the Principalities, especially at Bucarest, where Greek Princes were reigning at that time, and where the Roumanian national idea was as little evident as in Transylvania. The entire movement which ended in the reunion of the Roumanian countries was born from this event. When the Hungarians became sole masters in Transylvania, this movement created for them difficulties, which were all the greater because their ideal was not the recognition of nationalities, but their fusion by an amalgamation similar to that which operated in past centuries in western Europe. It was too late—in the 19th century—to undertake this task, even if the best means had been employed, and it must be admitted that the methods used were generally neither the most gentle nor the most legitimate. To-day we see Transylvania a Roumanian land, which is altogether natural since the Roumanians represent the majority of the population (over 60 per cent. according to the Hungarian statistics). But the Roumanian administration is confronted with difficulties almost as great as those which formerly confronted the Hungarian Government. If the Roumanians are in the majority, they have against them the traditions of long centuries of foreign administration. The peasant of the small mountain villages can scarcely realize that the Magyar is no longer the master. The merchant has been accustomed to speak Hungarian, whatever might be his nationality. The importance of non-Roumanian elements is augmented by the fact that they are concentrated in towns, and that, up to the present, they have enjoyed a monopoly of the administration and of almost all of the liberal functions. Travellers crossing rapidly through Transylvania generally gained an impression little in accord with the official Hungarian statistics. In the towns one heard only Magyar spoken. On the railway, unless travelling third class, conversation was in German or Hungarian among merchants, proprietors, or employees. Many inexperienced investigators have thus come back declaring that there were no Roumanians in Transylvania. The truth is that Roumanians do not occupy, among leading classes, a place which corresponds to their number. This causes difficulties which will disappear after one or two generations under the new order. Formerly there were very few primary Roumanian schools, only two Roumanian secondary schools supported by private funds, and not one Roumanian University. To-day there is a prosperous Roumanian University, secondary schools for Roumanian people in all the towns, and primary schools in all the villages. Henceforth one may enter all the liberal professions while still remaining Roumanian. *Pari passu* with the augmentation in the number of Roumanian functionaries, lawyers, doctors, engineers and merchants, the proportion of Roumanians in the population of the towns will increase, and with this will go the gradual reduction of that astonishing lack of equilibrium, the striking contrast between the urban and rural population, a contrast which became more and more pronounced under Hungarian rule, with all the difficulties which followed in its wake. One may already note certain changes, which are surprising, because of their rapidity, and interesting, as an indication of the artificial and easily transformed character of the national aspect of towns in a country of mixed population. The Hungarians used to tell how their "Kolosvar" formerly deserved its name of "Klausenburg." The Germans then held the upper hand; all the commerce was under their control. The town, nevertheless, became in the course of the 19th century the stronghold of Magyarism. Great administrative buildings, schools, and universities, even handsome residences of the land-lords, contributed to give the town its Hungarian stamp. The functionaries and the big business men imposed Hungarian speech on all. One could easily ignore the suburbs, peopled with Roumanians. To-day we see "Kolosvar" on the way toward deserving its name of "Cluj," the only name by which it was known to the peasants. The whole of the Roumanian banks and commercial houses are being installed in the capital of Transylvania. The employees of the railway and of the postal service continue to speak Hungarian among themselves, and Hungarian tickets, printed by the Roumanian railway administration, can be seen on the goods waggons; but already one finds Roumanians among the employees, and the Hungarian directors have, for the most part, emigrated. Some of them have even discovered that they are of Roumanian origin. The same phenomenon is observed daily among the merchants. If this evolution continues tranquillv. the ethnical and political conditions of Transylvania will appear much more normal fifty years from now.

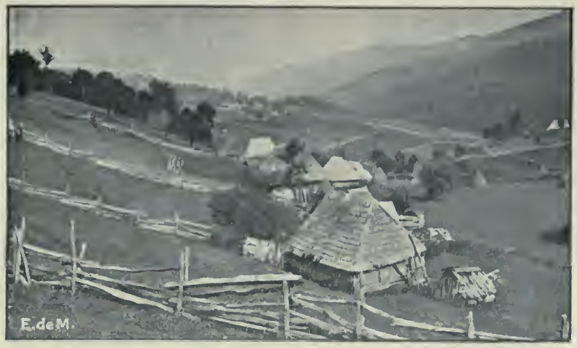
ECONOMIC DIFFICULTIES.

Political difficulties are not the only ones which exist and which should be smoothed out with the lapse of time. There are also economic difficulties, the very statement of which reveals a situation equally curious. Transylvania is not a country where farming is conducted on a large scale. With its girdle of mountains, covered with forests and grazing land, it was considered, in the framework of ancient Hungary, as deficient in cereals, rich in wood and in cattle. It remains in this same situation in the Roumanian state. But the crisis in respect to means of communication which followed the war, created a peculiar condition, a sort of plethora of natural resources. After the retreat of the Germans there was a scarcity of everything in Roumania, but especially of means of transport—horses and waggons, railway carriages and locomotives. Thus Transylvania found herself without means of exporting her cattle and her wood. Great piles of tree trunks bordered the railroad for many kilometres. The peasants had to sell their cattle at absurdly low prices. Great progress has already been made in re-organizing the railways, and a more normal circulation of agricultural products is being re-established from day to day.

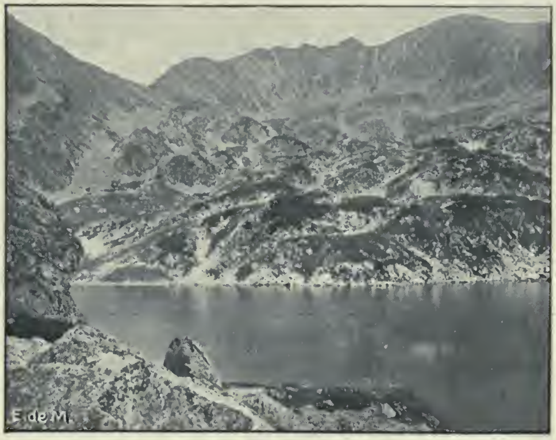
INDUSTRY.

Much remains to be done for the proper development of the mineral resources. If, up to the present time, deposits of petroleum comparable to those of old Roumania have not been discovered in Transylvania, numerous accumulations of natural gas are known, of which two alone are at the present utilized. Salt was mined even in the time of the Romans, as well as gold and iron. As for the iron resources, these were long in the hands of the Hungarians. The richest mines, those of Delar, in the Poiana Ruska, together with the blast furnaces of Vajda Hunyad (now Hunedioara), the equipment of which leaves nothing to be desired, were the property of the Hungarian state. The foundries and steel mills of Reshitza, employing 15,000 workmen and the most modern equipment, were formerly owned by a company in which French capital and French engineers held an important place. For twenty years, however, the Hungarians controlled it exclusively. The situation was the same for the lignite coal mines of Petroseny.

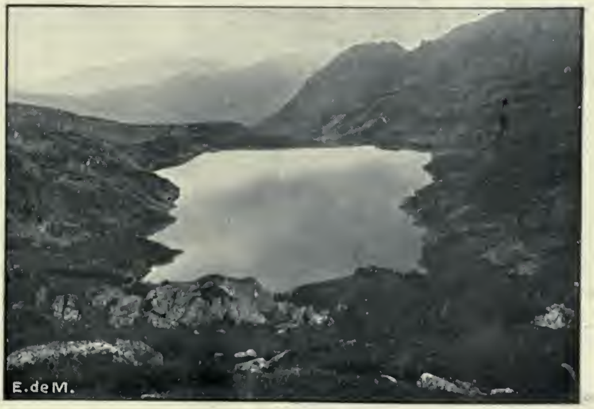
The reunion of Transylvania with the Roumanian Kingdom gives to the latter important industrial resources, which it formerly lacked. Petroseny can produce 2,000,000 tons of lignite. The anthracite coal deposits of the Banat yield 400,000 tons. The production of iron ore is equally important. But all this industry is in the hands of foreigners. At Bucarest one has noted the opposition to the conclusion of contracts by the Roumanian State with the Reshitza Company, whose halls were still filled with cannons manufactured for the Austro-Hungarian army up to the end of the war, and whose administrative council and engineers were Germans or Hungarians. One had to expect a very great augmentation of the capital of these companies, which involved a transformation of their character; and this operation was difficult without the aid of allied countries. The change is now practically completed, and the blast furnaces of Hunedioara, now the property of the Roumanian State, will be able to collaborate with the steel mills of Reshitza. So Transylvania is gradually becoming in organization and thought the Roumanian land which it has always been so far as its rural life was concerned.



Massif of Poiana Ruska. Adret and ubar.



Bucura: glacial lake. View towards the col.



Bucura: glacial lake.

Massif of Bihar.

Village of Toroczkö (Trascau).

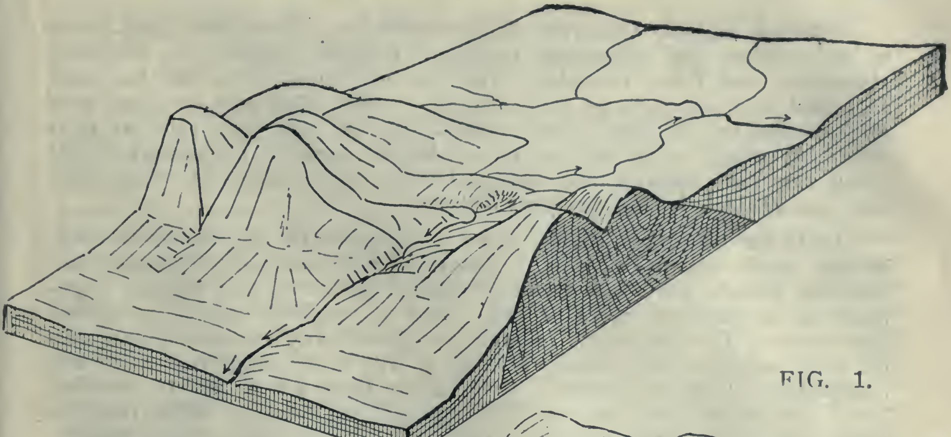


FIG. 1.

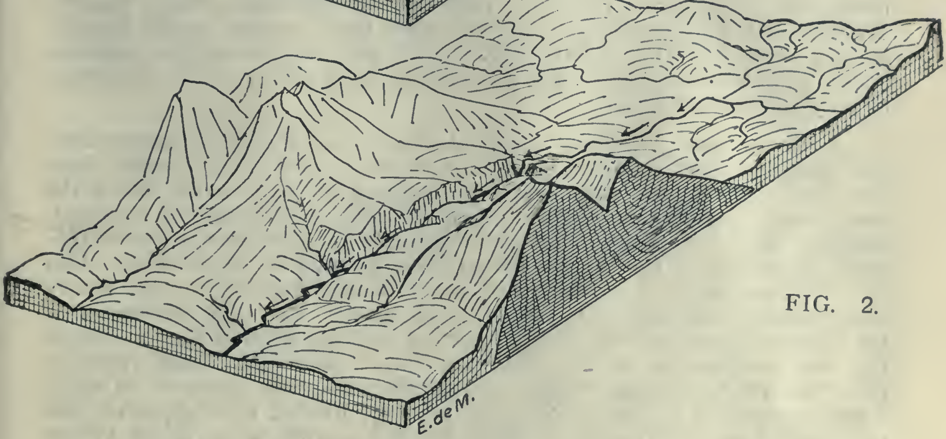


FIG. 2.

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ORDNANCE SURVEY AND MAP ISSUES, VIII.

WALLACE E. WHITEHOUSE.

THE list of new and forthcoming publications of the Ordnance Survey Office is rather shorter than usual, but a few items call for comment in supplement of the last set of notes which was published in the Autumn No., 1923, of the " Geographical Teacher. To the issues which represent the stock lines of the Ordnance Survey there have been some additions, and these are given under the usual headings.

ONE INCH TOURIST DISTRICT MAP.—No Tourist District Maps have appeared since Autumn, 1923, but the " Derby and the Peak " Map is now in the press and will be published in June. A description of it will appear in the next set of notes.

Popular Edition One Inch Map.—Seven new sheets have been added to the previous list. Amongst these are Preston, Manchester, Sheffield, Doncaster, and Great Grimsby. The Preston sheet (No. 29) has been examined, and proves to be very attractive. Both Blackpool and Southport are included on the map, which should have a very wide sale, as it is admirably suited for the planning of walking excursions. The eastern border of the map runs through the centre of Blackburn, but sheet 30, which overlaps No. 29, includes the whole of the town.

Quarter Inch Map.—This series is complete for the whole of Great Britain, as the sheets covering the North of Scotland and the Orkney and Shetland Islands have now been published. Sheet 5, The Eastern Highlands, is an excellent piece of work, and its legibility equals its artistic appearance. The indications of relief are particularly successful, and as a piece of coloured cartographical work it will bear comparison with any topographical map yet issued. The contour lines are at 200 ft. interval. They are distinct and cause no " terracing " of the map, while they are numbered so frequently that it is very easy to read intermediate heights. The 200, 400, 600, and 800 feet contours have been surveyed on the ground, as also have the 1,000, 2,000, 3,000, 4,000, but the intermediate contours between the level thousands have been interpolated and are to be considered as only approximately correct.

A Special Sheet, entitled, " England, South Central," has also appeared. The cartographical features of a part of this sheet have already been described. These were considered as being quite satisfactory when the earlier maps appeared, but the beautifully executed lines of Sheet 5, Scotland, together with its more open character, cause the English sheet to look rather crude by contrast. The thinner contour lines as used for the Scotland sheet are an improvement. In any case, the Ordnance Survey deserves hearty commendation and support for these special sheets. The rigid framework of the index necessitates sheet margins cutting through areas in such a manner that the information is "on the next sheet—or sheets," and even the generous overlaps employed do not always solve the problem. Certain Popular Edition 1 in. Special Sheet Maps, e.g., Bristol, have appeared, and one of the Liverpool District, including Chester and the whole of the Wirral Peninsula, is now in the press. The England (South Central) Special Sheet of the ¼in. map will be most valuable to motorists. London is near the Eastern margin (which passes through Erith), and the map is an unusually large one, as it covers Birmingham, Bath, and the central portion of the South Coast from 7 miles west of Lulworth Cove to Seaford.

Half Inch Map.—The revision of this series is proceeding, and sheet 36 will be published shortly.

* * *

Attention is also called to a monograph entitled " Air Survey and Archæology," which is in the press, and will be published by the Ordnance Survey Office. It is the work of Mr. O. G. S. Crawford, Archæology Officer. A review of the monograph will appear in these columns.

RECEIVED TOO LATE FOR EDITORIAL.

We learn that the Testimonial to Mr. E. J. Orford, late Hon. Sec. of the London Branch, will be presented in October next. The subscription list is still open. Mr. L. S. Suggate, 2, King's Road, London, N.4, is the Hon. Treasurer, and subscribers will receive further details by post.

LIVERPOOL AND DISTRICT REGIONAL SURVEY ASSOCIATION.

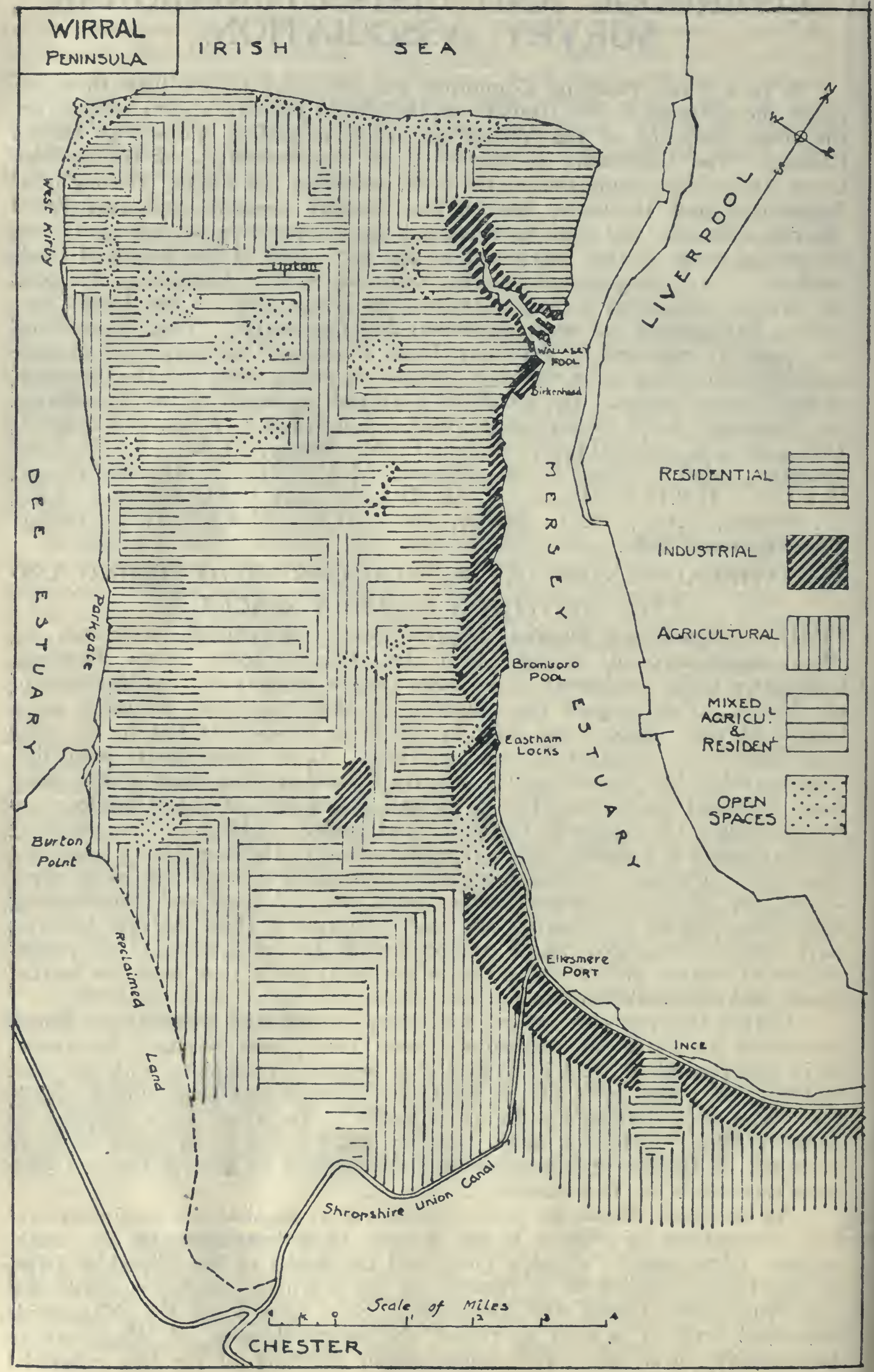
A Joint Town Planning Committee was constituted some little time ago under the auspices of the Ministry of Health, to prepare a joint scheme for the town planning of the Wirral peninsula extending almost as far as Chester. The Committee is composed of representatives of the various Local Authorities administering the area, including the County Boroughs of Birkenhead and Wallasey, four Urban District Councils and two Rural District Councils, and they have invited the co-operation of representatives of certain public bodies interested in the area, and of the principal landowners. The Liverpool and District Regional Survey Association accepted the invitation to send a representative who is not only on the Joint Committee, but also on its most important Sub-Committee. That Association has recently presented to the Joint Town Planning Committee a memorial and map containing their views on the zoning of the area and the provision of public open spaces. The memorial is signed on behalf of the Association by Professors L. P. Abercrombie, M.A., A.R.I.B.A.; P. G. H. Boswell, D.Sc., F.G.S.; A. Mawer, M.A.; P. M. Roxby, M.A.; A. W. Carr Saunders, M.A.; Miss L. Winchester, M.A.; Dr. C. O. Stallybrass, M.R.C.S., D.P.H.; Messrs. F. G. D'Aeth, M.A.; H. Fleming, J.P.; W. Hewitt, B.Sc.; R. C. Moore, M.A., M.Sc., M.Ed.; T. N. Philip; E. R. Rideout, B.Sc.

THE WIRRAL PENINSULA: SUGGESTIONS AS TO ZONING AND THE PROVISION OF OPEN SPACES.

THE Liverpool and District Regional Survey Association welcomes the opportunity of laying before the Wirral Joint Town Planning Committee their considered views upon certain aspects of the development of Wirral. They regard the planning of this important peninsula as a matter of vital concern not only to the local inhabitants but to the vast population of "Merseyside" as a whole. It is sometimes said that "Merseyside" has less attractive country around it than most of the other great towns of the North. But in Wirral, at any rate, it has at its doors no mean sample of a typical English countryside. Within a comparatively small compass it exhibits varied types of scenery: the sand-dunes along its shore lines, pleasant cultivated lowlands and plateau, small but picturesque dales, and, above all, considerable tracts of wild moorland commanding magnificent views of estuary, sea, and mountain. These natural beauties have been increasingly valued proportionately to the growth of an appreciation of Nature and of the desire to get away for a time from the bustle, noise, and dirt of the towns.

Within this pleasant setting are many ancient and interesting villages connected by numerous footpaths, green lanes, and winding bye-roads. It is still possible to feel in Wirral that sense of continuity with the past which in so many parts of the North of England has been almost wholly lost through indiscriminate industrialisation. To allow such villages as Bidston, Irby, and Burton to be wantonly spoilt would be to inflict as grave an injury on the future population of Merseyside as to deprive them of such open moorlands as Thurstaston.

An additional reason for preserving as far as possible the rural character and associations of Wirral is the growth of industrialism on its south-western edge, round Connah's Quay and the flanks of the Flintshire Hills. If this fact is considered in relation to the extension south-eastwards and then eastwards (along the Manchester Ship Canal) of the Merseyside industrial area, it is easy to realize the potential value of Wirral as an intermediate rural belt. The indiscriminate merging of the two industrial zones would be disastrous.


WIRRAL
PENINSULA
IRISH SEA
N
W
E
S
LIVERPOOL
West Kirby
Upton
WALLASEY POOL
Birkenhead
DEE ESTUARY
MERSEY ESTUARY
Parkgate
Bromboro POOL
Eastham Locks
Burton Point
Reclaimed Land
Ellesmere PORT
INCE
Shropshire Union Canal
Scale of Miles
¼ ½ 1 2 3 4
CHESTER
RESIDENTIAL
INDUSTRIAL
AGRICULTURAL
MIXED AGRICUL. & RESIDENT.
OPEN SPACES

The Association recognises, of course, that extensive changes are inevitable, but they sincerely trust that the future development of Wirral will be so controlled that, while due provision is made for the extension of commercial and industrial interests, and for the residential accommodation of the population overflowing from the congested town areas, everything possible will be done to preserve its natural beauties, its ancient villages, and the pleasant foot-paths, green lanes, and bye-roads connecting them.

The Association therefore asks the Joint Committee, and the Authorities represented thereon, to consider sympathetically in their planning schemes the possibility of:—

(a). Preserving the old bye-roads, green lanes, and footpaths in their existing condition, or with such changes only in the case of the more important bye-roads as are necessary to make them suitable for cycling or very light motor traffic.

(b). Preserving the old villages; and where they lie in the track of main roads, to provide bye-passes rather than to widen the road through the village by pulling down old houses and altering its ancient aspect, or in the case of entirely new main roads, to plan them so as to leave the ancient villages untouched.

(c). Preserving the woodlands, moorlands, beauty spots and view points in their natural conditions, and securing as far as possible that the same should be kept as open spaces for the enjoyment of the public.

The Regional Survey Association desire to commend to the favourable consideration of the Joint Planning Committee the following concrete suggestions in connection with the questions of Zoning and Open Spaces.

ZONING.

[Note.—It should be observed that in the matter of Zoning, the suggestions made by the Association deal on broad lines with belts of land. It is recognised that in some cases small areas within such belts have already been taken for other purposes (as for example, building plots in our agricultural zone), and that the development has proceeded too far to be entirely stopped. But it is hoped that in all such cases the diversion will be restricted as much as possible, and no further extension recognised].

1. *Industrial Areas.* It will be generally conceded that Wirral is not primarily an *industrial* district, but that the greater part is essentially suited —both by its character and situation—for a mixed residential and agricultural area. There should consequently be no difficulty in deciding to restrict the establishment of industrial works to certain definite regions. It is suggested that the industrial development should be confined to the undermentioned localities:—

(a). A narrow belt fringing both shores of the old Wallasey Pool (which district has for some time past been partly occupied by mills and various manufacturing establishments), and the extension of the same further inland, on to a portion of the lowlying area known as Bidston Moss, into which area it is understood that the Mersey Docks and Harbour Board propose to extend the navigable channel so as to enable the adjacent land to be used for storage purposes and industrial works. But it should be emphatically stipulated that this industrial area should not extend further than the railway line running from Docks Station to Poulton Station, and that the industries established there should be such as would not in any way destroy the amenities of the residential part of Wallasey (lying to the east, and therefore to leeward as regards the prevailing winds) by noise, smoke, dust and smell.

(b). The belt of land lying along the shore of the Mersey Estuary (and the Ship Canal) from Birkenhead to Ellesmere Port, and beyond that to the mouth of the Weaver. This area is already occupied in parts by industrial establishments (Bromborough, Ellesmere Port, etc.), and from its situation and transport facilities (by sea, canal, railway and road) seems destined to become an almost continuous industrial belt. Any new industrial works should be confined to the strip lying between the shore of the estuary and the main Chester Road as far as Great Sutton; and further eastward between the estuary and the railway line from Great Sutton to Helsby, with possibly an inland extension on the low-lying land beyond Ellesmere Port to include a restricted belt on the South side of the railway line not exceeding, say, a quarter of a mile in width.

(c). It is questionable whether industrial establishments should be permitted in any part of Wirral other than those indicated above, but perhaps a restricted development of *light* industries might be recognised within a small radius round Hooton Station.

[N.B.—It is assumed that no industrial development would be allowed on the landward side of the Great Central Railway south of Neston, including the land reclaimed from the estuary].

2. *Agricultural Areas,* comprising tracts of land, for the most part alluvial or relatively low-lying, which should be reserved for purely agricultural purposes (including market gardens), with only the necessary farm buildings, scattered cottages, and occasional very small village settlements. (N.B.—Other districts available more or less for agricultural purposes are included under (4).

(a). The land below the 50 ft. contour line (and in parts extending up nearly to the 100 ft. contour) in the northern part of the peninsula from Hoylake on the west to Bidston Moss on the east, and southwards from the coast approximately to the Frankby-Greasby-Upton road. The Blown Sand area (inland of the sand-dunes belt) in the Leasowe district, which is believed to be specially suitable in character for market-gardening, shall be kept open for that purpose.

(b). The valley of the Fender stream up to approximately the 100 ft. contour line, being an inland extension of (a), and constituting a broad open belt bordering the densely populated area of Birkenhead and district.

(c). The land lying below the 100 ft. contour line in the almost enclosed inland basin drained by the streams running into Bromborough Pool.

(d). The area—mostly carrying a thick coating of boulder clay—lying to the eastward of the Birkenhead and Chester road, and south of the Hooton to Helsby railway line, from the neighbourhood of Great Sutton to the Shropshire Union Canal.

(e). The area west of the main road from Heswall to Chester, extending southward from the neighbourhood of Burton to Gt. Saughall.

(f). The low fenland district of the Gowy valley south of the Hooton to Helsby railway line.

3. *Residential Area.*

The slopes of the elevated sandstone ridges which lie near the shores of the estuaries of the Mersey and the Dee, and which are in many parts not covered by boulder clay, are naturally marked out as desirable residential districts, and in many parts have been partly so developed. Areas available for further development are:—

(a). The westerly slope of the Wallasey district, and the similar slope of the ridge from Bidston to Higher Bebington down to the 100 ft. contour line.

(b). The belt of land on the north-easterly slope between the Birkenhead to Chester railway and the industrial area (1.b.), extending from Rock Ferry to Great Sutton, would serve to house a large portion of the population engaged in the adjoining industrial district. (The elevated area of Ince and Elton might similarly be developed in the future to provide for the housing of the workers in the industrial belt eastwards of Ellesmere Port).

(c). The westerly slope of the highland overlooking the Dee Estuary between Thurstaston and Neston, i.e., approximately defined by the main Chester road on the eastern side and extending coastwards to the 100 ft. contour line, or in places below it as far as the railway. There could also be an extension of this belt eastwards along the elevated tract of country between Heswall on the one side and Pensby and Barnston on the other.

(d). A restricted area on the higher ground about Upton extending westwards above the agricultural land (2a.) as far as Greasby and northward to Moreton.

4. *Mixed Agricultural and Residential Area.*

The larger part of the central area of the peninsula, standing at a general level of about 150 or 160 feet, while mainly devoted to agriculture, including small holdings, would afford facilities for a number of small residential communities especially in the districts where small elevated patches of sandstone free from boulder clay, or areas covered with drift sand, afford suitable building sites, e.g., Thingwall, Thornton Hough, Raby, Hinderton, Childer Thornton, Willaston, Ledsham, Capenhurst, etc. The extension of such settlements should be restricted so as to preserve the general character of an open countryside.

Such development as may be allowed in this area should be definitely related to the old centres so as to maintain the continuity of community life. " Ribbon " development, tending to obliterate the old natural centres, should be discouraged.

5. *Open Spaces.*

It is assumed that the provision of open spaces for recreation and the preservation of parts of special beauty and interest, will be considered generally from the point of view of the district as a whole, and as a joint responsibility rather than an interest of the authority in whose area the particular piece of land lies. It may probably be considered desirable, in some cases at least, that areas so acquired should be administered by a permanent Joint Committee. It is hardly necessary to urge the importance of steps being taken at the earliest possible date to secure the possession or the reversion of such sites for open spaces as may be decided upon.

The following areas are specially commended to the consideration of the Joint Committee :—

(1). (For the purpose of playing fields.) The open land lying on the north side of the footpath from Oxton towards Woodchurch, as far as the cross lane running from Woodchurch Road towards Noctorum, and also the fields on the south side of the same footpath as far as Holm Lane.

(N.B.—The open space on the north side of the footpath should extend quite up to Talbot Road, so as to secure that point without interruption the very fine and extensive view across the peninsula to the Welsh mountains and coast.)

(2). The worked-out quarries and the pine woods at Higher Bebington on the west side of Storeton Road as far as Red Hill on the south; together with the old grass grown quarry on the *east* side of Storeton Road immediately south of the present quarry workings.

(3). Raby Mere and the adjacent tract of woodland; the stream valley with a marginal walk by the side of the stream to Dibbinsdale; and the fields on either side of the footpath running from Poulton Road to the Rake (Bromborough) with the woodland on the railway embankment and adjacent to the stream, from near the filter beds northward to just beyond the point where the stream passes under the railway line.

(4). Barnston Dale. The valley and side slopes from where the main road from Barnston to Arrowe crosses the stream as far as the footpath from Little Storeton to Thingwall; together with Thingwall Common, the area on the north-west of the Common up to the main road to Arrowe, and the three fields adjacent to the stream on the north-east side of the common.

(5). Arrowe Park. The area bounded on the north by the road to Greasby, on the south by the road to Irby, and extending from the main road (Barnston to Upton) westwards down to and including the Arrowe Brook and the fringing strip of wood.

(In connection with this the establishment of a railway station on the Great Central Railway where it crosses Woodchurch Road would be of advantage, and the improvement of the footpath from Landican to the road running past Arrowe would make a pleasant route for pedestrians to reach Arrowe Park.)

(6). Thurstaston and Irby Commons. The extension of the public open ground on Thurstaston Common to include all the land lying between the main (Heswall to Grange) road on the west; the road from Caldy past Farmers' Inn to Irby Mill on the north; the road from the Mill southwards to the end of Irby Hill Common and the lane from the lower part of the Common to Irby Heath on the east; and the road from Irby Heath to the main Chester road on the south.

(7). A small area on the west *slope* of *Heswall Hill* between Piper's Lane and the footpaths numbered 3, 4, and 7 on the Wirral Footpaths Association's map, surrounding the grounds of the Joint Hospital, and any other small areas in the open land which can be secured at reasonable cost, including the strip of pinewood in the fork of the roads to Barnston and Heswall Hills Station respectively, near the Glegg Arms.

(8). Burton and Haddon Woods. (a) The woodland lying to the north of the present public ground at Burton, including the Mill Wood and the space round the ancient mill and as far as the road to Ness; (b) Haddon Wood standing on the very high ground to the North of Burton, and (c) the land between these two Burton Woods.

(9). Hooton Race Course and adjoining land extending from the new road (Eastham to Ellesmere Port) on the east, reaching the road from Poole Hall to Overpool, and including Well Wood and the valley down to the estuary. This would provide for the needs of the people of Ellesmere Port and for those who will accumulate as the estuary-side is increasingly industrialised.

If any necessary main road is carried across the southern part of the area it should be so constructed as not to obstruct the Continuity or the Valley.

(10). The Central portion of the *Caldy Ridge* extending from north of Caldy Village to Caldy Grange Grammar School and thence continued by as wide a belt as possible on the west side of the main road from "Liberty Piece" by the Beacon to the grounds of the Abbey Manor. It is assumed that on the north side of the road leading to West Kirby the greater part of Grange Hill will also be preserved.

In addition to the above mentioned sites for open spaces the Association desire to press for favourable consideration the following additional smaller areas :—

(11). An extension of the existing open public space on Bidston Hill to the northern end of the ridge so as to include the ancient and historically interesting Bidston Hall and also the rhododendron gardens.

(12). The preservation of a broad belt of land with trees on the north side of the road from Eastham Ferry to Eastham Village; and also such portions of the Eastham Woods as it may be possible to retain without undue restriction of the industrial development on the land adjacent to the shore.

(13). The picturesque dell known as the Dungeon near Oldfield.

(14). The open ground of old quarries lying to the east of The Breck at Wallasey with access from Wallasey Road.

SOME EXAMPLES OF PROCESSES OF VALLEY FORMATION.

C. A. Simpson.

IN the course of some observations in The Cotswold uplands between Cheltenham, Stroud, Cirencester, and Fairford, valleys were found which illustrate in a striking manner how much both direction and cross section are determined by rock structure, and how this factor, together with former tectonic disturbance, has modified the normal cycle of erosion. The area observed is included in the following maps:—Ordnance Survey, 4 miles—1in., sheet 8; 2 miles—1in., sheets 27 and 28; 1 mile—1in. (popular edition), sheets 92, 93, 103, 104. Geological Survey, 4 miles—1in., sheet 15; and 1 mile—1in., sheets 34 and 44.

This upland is part of one of the escarpments which cross the English Midlands from S.W. to N.E., the greatest altitudes are found on its N.W. margin, and the slope is gradual down to the vale of the Upper Thames on the S.E., but there is a steep fall (" edge " or escarpment) to the plain of the lower Severn on the N.W. The dip is so slight to the S.E. as to be almost imperceptible to the casual observer, but here and there, often quite unexpectedly, a break or groove is seen in the surface of the plateau, which must be approached closely before it can be seen whether the valley contains a stream or not, and in the east of the district these valleys do not appear to affect the generally level surface of the upland. Many are deep and wide in proportion to the streams they contain, and some are nearly dry. Many show the swinging curves characteristic of valleys in limestone country, and some are nearly straight. Often the streams have cut down to the underlying clay, which either forms the valley bottom or crops out on the valley side, between two much steeper slopes formed of limestone of different geological periods. Towards the west, the proportion of upland to lowland diminishes, the valleys are nearer together, and are separated rather by ridges than by a plateau surface, and the rivers belong to the Severn drainage system instead of to that of the Thames. The streams which flow directly to the Severn rise near the foot of the escarpment, and are usually small, sluggish streams, but the Isborne, Chelt and Frome rise behind the escarpment, and cut through it in remarkable valleys. The convergence of the two former of these " gaps " with the Coln valley, near Andoversford, is very striking.

The main streams of the district, however, rise S.E. of the escarpment, and flow down the dip slope to the Thames, which, continuing the direction of the "Swill Brook," flows approximately from west to east. When seen on a small scale map, these rivers, the Coln, Leach and Windrush, and some more insignificant streams, appear to be simple dip streams flowing S.E. in order to join the Thames in a normal fashion. On a large scale map their courses are not so simple as might be supposed. The Churn flows south in this region, but turns to the S.E. on reaching the clay vale of the upper Thames.

The Cotswold upland is crossed by lines of faulting, which are especially numerous in the north of the district observed. Many of these faults are shewn in the Geological Survey maps, and additional ones have been found since their publication. Moreover, there seems reason to suspect the presence of yet others, and prolongations of those already mapped, either in the form of true faults or monoclinal folds, and, in the opinion of the writer, the Cotswold faults are of immense importance in determining local land-forms.

It will be seen from the map that in order to grasp the plan of the drainage system as a whole, the dry valleys should be taken into account as being of almost equal importance as those containing streams. The origin of dry valleys has been variously explained. The Rev. E. C. Spicer[3] considers that those in the Cotswold and Chiltern Hills have been formed by solution of the rock in which they occur (limestone and chalk respectively). Mr. Clement Reid[4] inclines to the view, in accounting for dry valleys in chalk, that they are the result of erosion on a frozen surface, during or after the glacial period, and is quoted by Mr A. J. Jukes-Brown[5] in his explanation of those found in North Wiltshire, but he adds to it the theory that the drainage system was marked out, in the first place, on a clay covering, before the Glacial Period, and that subsequently those channels were considerably deepened and accentuated by erosion on a frozen surface, and by the violent floods which doubtless took place in Spring after glacial times. Although he here only refers to valleys in chalk, perhaps the same reasoning might be applied to the limestone of the Cotswolds, which may, very probably, have once been covered by a clay surface now stripped off, and upon which the present river system may have originated. He does elsewhere[6] allow the probability of some features of limestone valleys being attributable to the chemical action of water, which soaks into the waterways, and so suggests that the valleys may have " swallowed up " the ancient water-courses which determined the directions of present subterranean streams. Mr. Buckman[7] suggests that some dry valleys on Cleeve Hill (Fig. 1) were excavated by streams thrown off by Fuller's Earth when it still covered the limestone now forming the surface here, and that when the clay was removed, the valleys in the porous limestone became dry. As an alternative he suggests that if the amount of rainfall were formerly greater than now, it would have flowed off as surface water over the saturated porous strata, to form surface streams. Perhaps both these processes occurred in the Cotswolds. In some instances, too, when a dry valley is in line with a reach of another river now separated from it by an upland area, crossed perhaps by a " pass " or " col," capture may be suspected. In many details, however, the dry valleys of this district resemble those described by Mr. Spicer, which he considers to be due to solution.

But whether the Cotswold valleys were formed by capture, solution, or erosion on a frozen surface, or a combination of all three, it appears that the length of the dry area varies according to the season, the saturation of the underlying rock, and therefore on the depth below the surface of an impermeable clay formation. In most of these limestone valleys there is a dry reach near the head, and often traces of a water-course, fringed with rushes, for some distance above the visible spring, pointing to the presence of water there in an exceptionally wet season. Careful study shews that dry valleys occur where limestone is thickest, and where the next stratum of clay is at some distance below the bed of the stream, as in that remarkable branching system of dry valleys known as " the Warren," and shewn in the map.

Streams sometimes suddenly disappear, to reappear at some distance further down. A striking instance of this was seen in August, 1922, in a stream tributary to that occupying the Througham valley. Near the junction, this stream, about three feet wide, disappeared underground for about 100 yards, emerging about two yards from the main stream. Above the underground water-course the ground was marshy. It had been flowing over an impervious surface of Fuller's Earth, but near its mouth the tributary stream appears to have cut its way down to the under-lying limestone, in which the water disappears. Many other examples might be given to shew that the difference between dry valleys and those containing streams is only one of degree, and that the former are needed to complete the strangely symmetrical pattern made by the river system in this region.

Obviously alternating and sometimes very narrow bands of more or less resistant rocks in vertical succession also control the unequal gradients of the valley sides, and cross-sections are on the whole very consistent, according to structure. Those drawn across the Churn valley and its tributaries are typical of valleys in Great and Inferior Oolite separated by a band of Fuller's Earth. It is seen all over this district how buildings tend in a marked degree to accumulate on or near the " shelf " of impervious rocks which holds up water-supply, and above which, if springs do not naturally emerge, wells can be made.

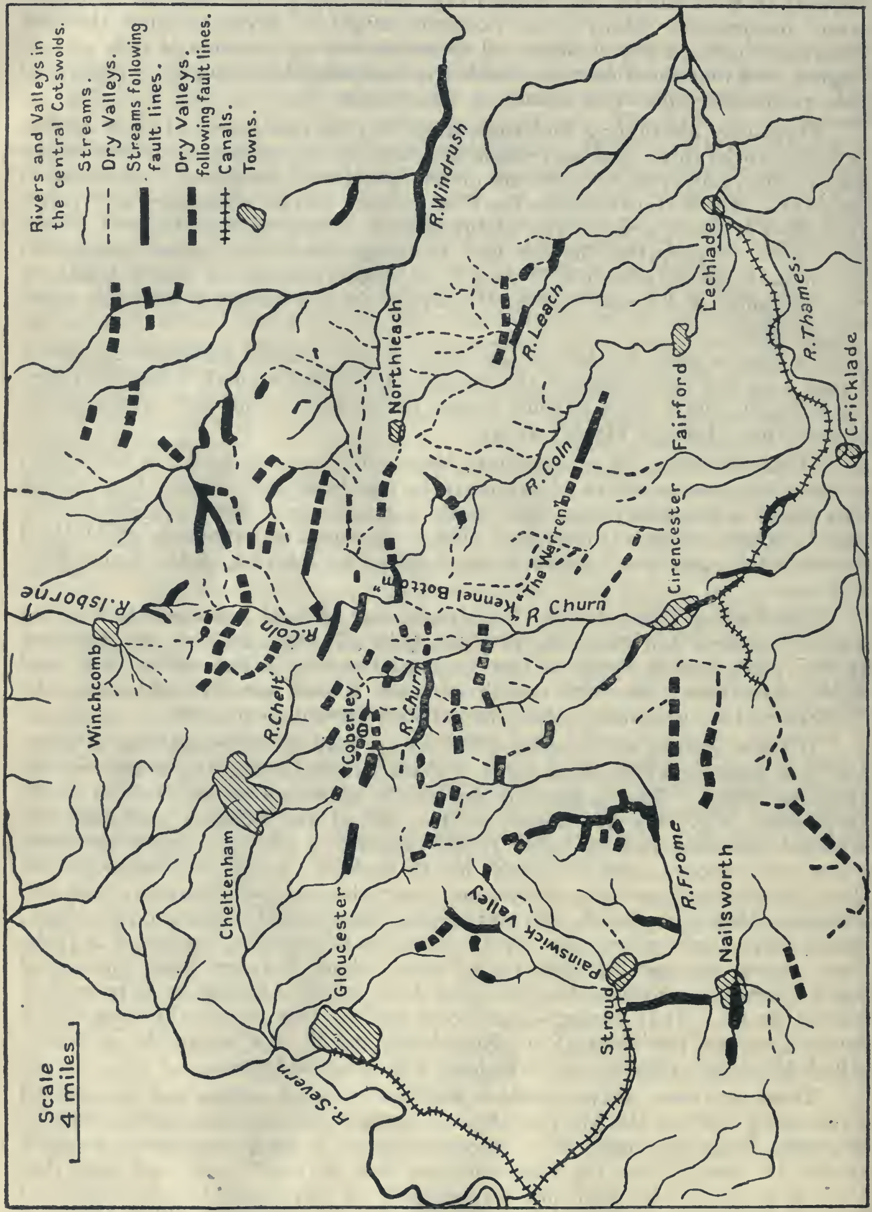
In valleys such as that of the upper Churn (above Colesborne), where Upper Lias has been reached, the stream has formed a small V-shaped valley bordered by much more gradual slopes of Midford Sand, with steep slopes of limestone (Inferior Oolite) above.

When processes of erosion have been still longer at work, or have been assisted by some accident of structure to penetrate still deeper, Upper Lias clay forms a flat valley floor and Midford Sands make low irregular " foothills " below Inferior Oolite, and villages occupy the exposures of Midford Sands within easy reach of the water held up by the clay of the Upper Lias below.

The Churn, Coln, Leach, Windrush, and several intermediate streams and dry valleys (although in the main their direction follows the dip-slope to S.E.) are seen in detail to flow in short reaches, in alternating N.S. and E.W. directions; the N.S. reach of each stream usually continuing the N.S. line of its neighbour which has already turned to the east.

If these valleys are examined further, it may be observed that in some the N.S. reaches exhibit more signs of maturity, and are on the whole broader than the others. This is possibly due to the character of the rock in which they occur, e.g., the Windrush, on the line of the Bourton anticline, has widened and deepened its valley proportionately as the clay below the limestone was exposed, and it is only due to faulting, which near Stow has let down a mass of resistant limestone, that the vale of Bourton does not extend further to the north. In considering the effect of faulting on drainage, many cases occur where the stream actually follows the course of a fault-line; some run parallel with faults but a short distance from them, and some appear to continue the line of a fault which has not been proved to extend so far. It is perhaps significant that in this region the area where faulting is least prevalent (S. of Northleach and E. of Chedworth) is that in which the rivers descend the dip-slope with least deflection.

There are many ways in which the formation of valleys can be assisted by faulting. Prof. W. M. Davis[8] pointed out how fault-line valleys may be discontinuously developed in a second cycle of erosion (and there is much reason to suspect that the Cotswolds are now in this stage) and says that " in a second cycle, fault-line valleys will be developed by the action of revived consequent streams, or of subsequent streams working along a shattered zone of a fault." It is certainly remarkable how many fault-line valleys here do appear to be " subsequent," and have developed along lines of weakness caused by shattering of the rock (which probably corresponds to the dominant joint-plane of the limestone), or, more often, along the junction of " hard " and " soft " rocks which have thus been brought side by side. Moreover, faulting has influenced the formation of Cotswold



All the illustrations accompanying this article, and appearing elsewhere in the "Geographical Teacher," are printed from blocks made by Messrs. Bale and Danielsson, Great Titchfield Street, W.

valleys even more frequently by bringing to the surface " soft " strata which would not otherwise have been exposed to the agents of denudation.

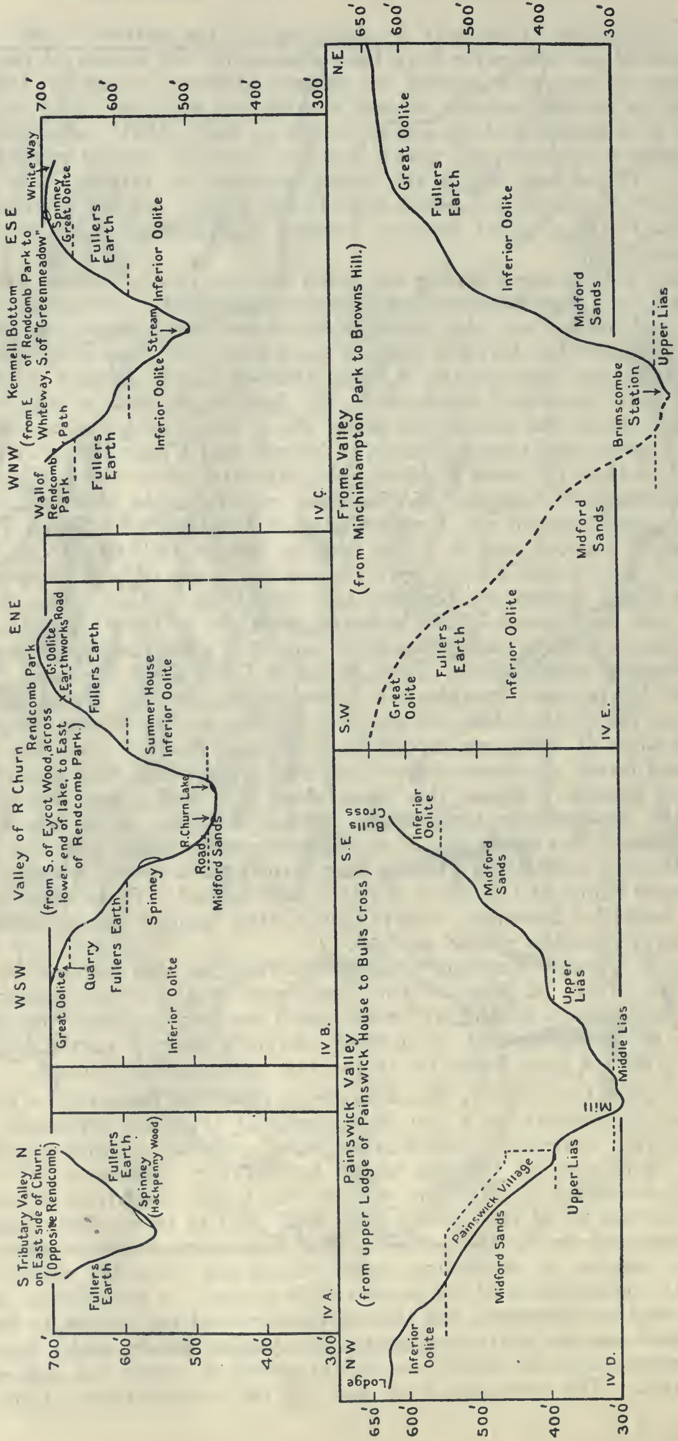
Some valleys here exhibit an entirely different character from those shewing the normal features of river erosion and solution. S.W. of Bibury, the bed of a stream (which was quite dry in April, 1921) follows for about three miles a straight line where Inferior Oolite is faulted against Forest Marble. The stream leaves this valley abruptly by turning N.E. through a very narrow gorge, to join the Coln below Bibury, but the fault-line valley continues in the original direction beyond, and unaffected by the angle of drainage.

Many valleys shew plainly one steep and one gently sloping side, where faulting brings together rocks of different permeability. An instance of this is seen at Coberley and also opposite Rendcomb Park, where, at the mouth of a small valley on the right bank of the Churn, the steep side to the north is of Limestone, and on the S. side Midford Sands form a gentle slope covered with trees and brushwood. In Rendcomb Park a lake has been artificially made just below the point where this fault crosses the Churn, and at a spot where there is reason to believe that Upper Lias clay is nearer the surface than for some distance either up or down stream. Fig. 2.

Well-marked examples of fault-line valleys with sides of different gradient cross that of the Upper Churn at Coberley and Seven Wells respectively. Figs. 4 and 5. The farm at Upper Coberley (Vide Fig. 3) occupies the actual head of the valley, where the exposure of Midford Sand disappears beneath Inferior Oolite. Above this point the steeper side is reversed—Fuller's Earth crops out to form a gentle slope on the north contrasting with limestone opposite. The buildings shewn are near a spring which issues above Fuller's Earth near the fault, and the windmill for pumping purposes is characteristic of this limestone region. The same fault has a different effect on another valley situate further east. A steep slope of limestone capped by " Fuller's Earth " clay, has been let down, and forms an almost cirque-like valley-head which rises abruptly from the valley bottom. Below this steep slope is a well where water is held up by the impermeable beds below. Many examples occur where valleys have curiously blunted heads, of a cirque-like appearance, and sink to their full depth quite suddenly; where a fault throws out a spring which gives rise to a stream below and forms a resistant wall behind. These differ from the normal heads of limestone valleys which start almost imperceptibly by a slight sagging in the upland surface.

Fig. 6 shews yet another effect of faulting on the course of a stream in a valley N.W. of Bisley. The upper part of the valley appears to be normal, and swings to and fro in the usual manner, but near the clump of trees in the foreground it is suddenly diverted sharply to the right, and coincides with a fault down to its junction with another stream.

The upper Coln valley, which has been described minutely by Prof. W. M. Davis and others as a typical example of " incised meanders,"[9] also illustrates the extensive modification of the normal conditions of river history which can be brought about by faulting. An axis of synclinal folding, considered by Mr. Buckman to run southwards from Cleeve Hill, must pass just E. of this river. This fold, said to be of slight amplitude, partially eroded during the period of the deposition of the Inferior Oolite, and then covered by succeeding strata, would not reach the surface at the time of the development of the present river system. It nevertheless involves a thickening of limestone, and therefore one would not expect to find here Coln. Both on the north and south the syncline passes under bare, high dry limestone regions, where the valleys which do occur are not occupied by streams. The coincidence of part of the clay-bottomed Coln valley


S Tributary Valley N
on East side of Churn.
(Opposite Rendcomb)
Fullers Earth
Spinney (Hackpenny Wood)
Fullers Earth
700'
600'
500'
400'
300'
IV A.
Valley of R Churn
(from S. of Eycot Wood, across lower end of lake, to East of Rendcomb Park.)
WSW
ENE
Great Oolite
Quarry
Fullers Earth
Inferior Oolite
Spinney
Road
Midford Sands
R. Churn Lake
Summer House
Inferior Oolite
Fullers Earth
Rendcomb Park
Earthworks
G. Oolite
Road
IV B.
Kemmell Bottom
(from E of Rendcomb Park to Whiteway, S. of "Greenmeadow")
WNW
ESE
Wall of Rendcomb Park
Path
Fullers Earth
Inferior Oolite
Stream
Inferior Oolite
Fullers Earth
Spinney
Great Oolite
White Way
700'
600'
500'
400'
300'
IV C.
Painswick Valley
(from upper Lodge of Painswick House to Bulls Cross)
N W
S.E
Lodge
Inferior Oolite
Midford Sands
Painswick Village
Upper Lias
Mill
Middle Lias
Upper Lias
Midford Sands
Inferior Oolite
Bulls Cross
650'
600'
500'
400'
300'
IV D.
Frome Valley
(from Minchinhampton Park to Browns Hill.)
S.W
N.E
Great Oolite
Fullers Earth
Inferior Oolite
Midford Sands
Brimscombe Station
Upper Lias
Midford Sands
Inferior Oolite
Fullers Earth
Great Oolite
650'
600'
500'
400'
300'
IV E.

with this syncline seems due to the presence, at right-angles to the latter, of some of the most important faults of the district, the throw of which must have so far exceeded the amount of thickening of the limestone here, as to have raised up the underlying clay far enough to be reached and exposed by erosion. The most striking feature of the valley is surely the regularity of three almost rectangular areas of clay defined by faulting, and forming the valley bottom near Andoversford, Foxcote, and Withington and in addition the striking contrast in character and vegetation of these three small areas with the limestone uplands enclosing them. Does it not appear likely, also,that the varying rock-structure, together with ancient tectonic conditions, has contributed towards the formation of meanders at different altitudes? The most prominent spurs are those on which a limestone covering still remains, and which project into the valley bottom which has reached the clay level, and a remarkable amphitheatre on the E. side of the valley marks a spot where the river is still cutting its way into the limestone wall, perhaps being forced to work eastwards owing to the dip of the clay surface on the flank of the supposed syncline.

Clearly a great part has been played by fracture in the enlargement of the valley of the Chelt, now a scarp stream, but which may have originated as part of a former dip-stream, and of the area west of Andoversford, which may be considered as an inlet in the upland area, with Cleeve Hill remaining as an island. This points to the probability of Cleeve Hill, and still later those areas of the present plateau which include Leckhampton and Pegglesworth Hills, becoming " outliers " in future. The outstanding " Peak " of Painswick Beacon is also defined by faulting. The anomalous directions of the streams in the west of the district are almost entirely due to faults, which here run mainly parallel with the escarpment, and so appear to have diverted the drainage to the south from the normal S.E. direction of dip-streams, until they are gathered up by the " obsequent " valley of the Frome.

Mr. J. H. Taunton[10] has discussed the loss of water from the Churn in its limestone bed above North Cerney, and the re-appearance of some of it as Boxwell Springs, thrown out by the fault near South Cerney, eight miles away, and how some of this water is led under ground by faulting to re-appear in the Frome valley. But it is hoped that enough has been said to shew how, in country such as this, which is being gradually stripped of its surface coverings by means of erosion during long periods, the deep-seated tectonic conditions become more and more influential on existing topography as erosion proceeds.

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EXPLANATION OF PHOTOGRAPHS.

1. Head of dry valley on Cleeve Hill (Inferior Oolite) leading down to the valley of the Isborne.
2. Rendcomb Park, shewing the lake and a (temporarily) flooded area above it, in the valley of the Churn. A—A shews direction of a fault crossing the Churn valley.
3. Upper Coberley, looking N.W. down a fault-line valley towards the gap in the escarpment containing road to Cheltenham. A—Inferior Oolite. B—Fuller's Earth. C—Position of spring.
4. Fault-line valley at Coberley. A—Steep slope formed on Inferior Oolite. In fore ground is the slighter gradient on Midford sands.
5. Fault-line valley crossing that of the Churn near Coberley. A—Fault-line valley. B—Valley of the Churn.
6. Througham-Slad valley. A—Great Oolite. B—Fuller's Earth. C—Inferior Oolite. X—Fault-line.

Studies in Tidal Power. Norman Davey. xiii + 255 pp, 25.5 x 19.5 cm, many charts and text figs. London: Constable, 1923. 32/-.

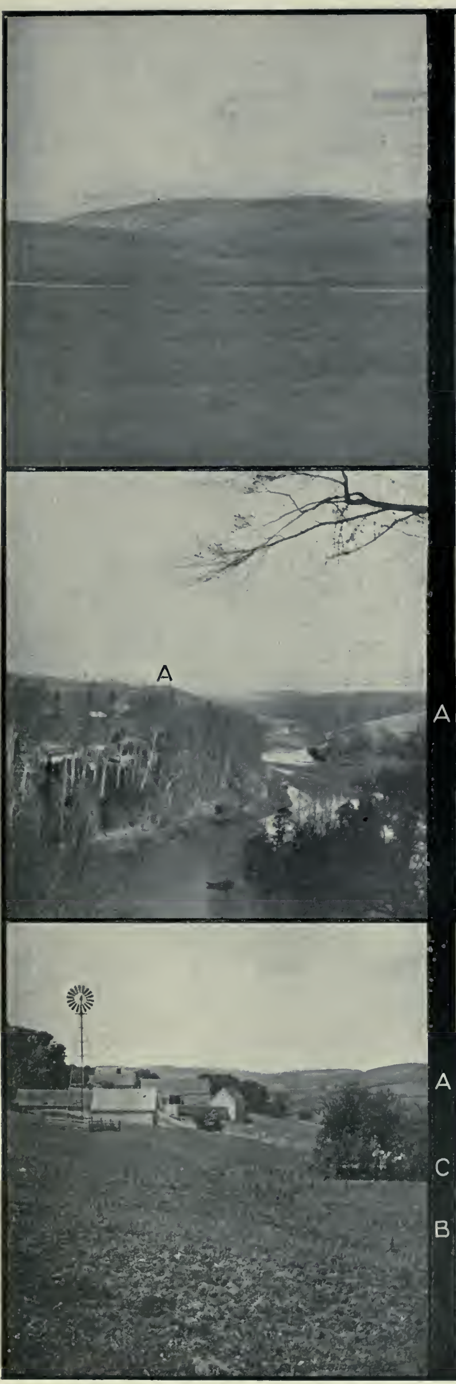
The delay about the Severn scheme, which was pushed publicly before it had been maturely considered, has given a set back to the idea of tidal power, which is thought by some engineers of reputation to be uneconomical in its working, while the fear of unforeseeable consequences in dealing with so mighty an agent as the sea and the difficulty of estimates as regards upkeep, cleansing, and repair, are further deterrents. In such a phase of the development of the subject it is, therefore, well that a convinced exponent should come forward and give a serious account of what he thinks may be done. The only practical proposals for utilising tidal power so far relate to the damming of portions of estuaries and inlets based on a French idea first seriously put forward in 1839, and likely to be realised at Aber-vrac'h, near Brest, before long. The utilisation of the power of tide-races and the like is still in the stage of purest speculation.

The author gives a general account of tides and their ranges based on the Admiralty Tide Tables and Darwin's "The Tides," which is such a valuable and clear introduction to the subject. The extreme and recurrent variability of the "head" of water available in a tidal basin (from 1 to 5 in the same basin) is a cardinal factor, as the power varies as the square of the head. A survey of tidal power shows that France and Britain possess much more tidal power than most other countries, and the student is referred to the valuable tables giving details for most part of the world, and very detailed estimates for all the British coasts. The book has 66 charts of British inlets, and discusses in detail the possibilities in the Severn estuary, at Salcombe, at Fleetwood and at Barrow. Lest we should exaggerate the possibilities of tidal power, the author warns us that the full development of the tidal-basin idea would effect a saving of only 6½ per cent. in our coal consumption. None the less there remains the possibility of industrial development along some of our estuarine shores, and it is the duty of geographers and town planners to be ready for this, so as to arrange for healthy and economical conditions and to avoid the disasters that the introduction of coal brought through unpreparedness of welfare workers in face of the powerful action of the vested interests.

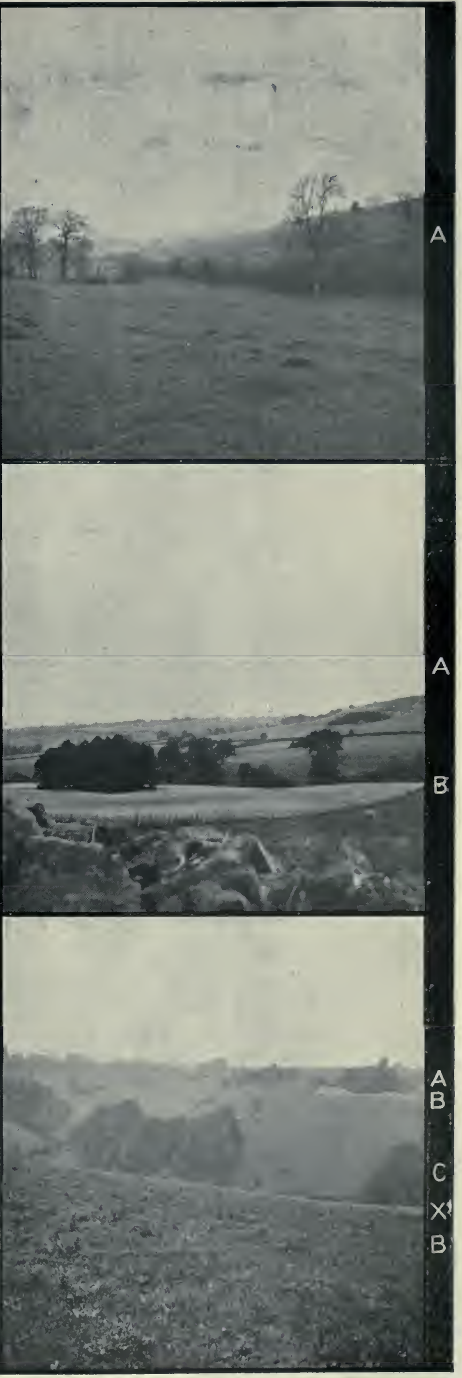
Barytes in Ireland. T. Hallissy. 24½ x 15 ½ cm. 81 pp. Eason and Son, 1924. 2/6.

The late Professor Grenville Cole, in his introduction, states that "For the first time a Cainozoic age is assigned, with much probability, to the Irish deposits, and it is suggested that the gangue at present associated with many of our sulphide ores is far younger in geological time than the deposition of the ores themselves. The relation of the formation of barium sulphate to the erosion-surface of the superincumbent rocks is here interestingly pointed out, and it is shown that the investigation of a mineral deposit may involve a question of geography." Mr. Hallissy certainly marshals his facts skilfully and scientifically, and brings much evidence to support his suggestions. After a general introduction on the properties of barytes and its mode of occurrence, he proceeds to give a detailed list of the barytes deposits in Ireland. He then gives an interesting account of the genesis of barytes and shows, on a map of the Cork district, that the formation of barytes lodes is dependent on the sulphides in the rocks of the superficial zone. The fact that in the Old Red Sandstone of this district the barytes deposits are strictly confined to a definite horizon, a narrow belt towards the top of the series, is clearly shown on the map and is of great importance. The chapter on the industrial uses of barytes is invaluable for the economic geographer, and there is a useful discussion of the probable future establishment of a lithopone industry near Silvermines, co. Tipperary.

PROCESSES OF VALLEY FORMATION.



1—3.



4—6.

COMMUNITY CENTRE IN KENTUCKY MOUNTAINS.

Caney Creek: typical valley in Plateau Region.

A Mountain Woman.

Caney Creek: teacher's house.

Plateau view from highest ridge.

A COMMUNITY CENTRE IN THE KENTUCKY MOUNTAINS.

V. **Mignon Couser.**

IN the West of the Appalachian country, which extends from New York to central Alabama, is the Alleghany-Cumberland plateau, facing the greater Appalachian Valley to the east and sloping north-westward toward the Interior Lowlands. So completely is it dissected that little of its plateau nature is in evidence except the even sky-line. To the inhabitant this region is always " The Mountains," and he is proud to style himself a mountaineer. In Kentucky this mountain area comprises one-third of the State, forming a continuous slab on its eastern side. The topography of the country makes it comparatively inaccessible, and yet three-quarters of the population of Kentucky are highlanders.

Seven years ago, a Boston woman, travelling in eastern Kentucky in search of health, was struck by the needs of the mountaineers in Knott County, and, helped by a small grant of land from a mountain farmer, founded the " community centre " which to-day is attracting attention throughout the United States. Workers are drawn to it from North and South, who may point out their opportunities for development to the children " lost among the mountains."

This Community Centre is at Caney Creek, of which the Post Office, built by an American Browning Society, is called Pippapass. It is not on the map yet, nor is Wayland, its nearest railway-station, but Ashland is marked on the larger atlases, and Caney is about 120 miles to the south. From Ashland, the railway follows the Big Sandy River, and branches westward at Beaver Creek to Wayland. This last stage of the train journey follows the narrow bottom of a creek, tributary to Big Sandy, through a mining section, where bituminous coal and natural gas are easily worked in a region of soft shale and friable sandstone. Little towns of wooden houses, built for shelter and not for comfort or beauty, huddle close to the railway tracks every few miles. The coal dust and the monotonous ugliness of the mining-centres make the traveller glad to end the slow journey and to reach the terminus, Wayland. This is a more pretentious town, and is gay in summer with grass-plots and flowers. But the long main street has two rows of small houses all exactly alike, which recall to mind those drawn by a small child when he first manipulates a pencil.

To reach Caney from Wayland the usual mode of travelling is by " jolt-wagon," a four-wheeled cart without springs, effectively controlled by a primitive brake, and drawn by two mules. The Irish jarvey's admonition, " Howld yer howlt! " is in order, for the roads are unFordable. The four wheels are never at the same level, and a hole three feet deep or a rock projecting two or three feet and extending half across the road is a commonplace. The fares who try to sit too tight are almost disjointed before their five hour drive is over. The road follows the creek-bottom, sometimes longitudinally, sometimes transversely, and lies as often in the stream as by its side on the narrow bank.

When the shaken ones have acquired confidence in the competence of the driver with his brake-rope to keep things right side up, they realize the beauty of the surroundings, steep hills rising for about 750 feet (1,700 above sea level), like the sides of a huge trench in which he is confined. The valley is as perfectly V-shaped as a diagramatic illustration of a young valley; the spurs and the tributary valleys (" branches ") are true to type, and when evening comes, the contour of the hills has the regularity and simplicity of a cardboard silhouette.

Trees cover the hillsides to their summits with a mass of colour of variegated sameness—the greens of spring, and the rusty, glowing, coppery tints of fall—not " autumn " there. These trees are mostly deciduous and of many different species even on one slope—beeches, chestnuts, oaks of various kinds, dogwoods, hickories. Here and there are fields of corn on slopes so steep that cultivation without terracing might be thought impossible. But the mountaineer, helped by his entire family, with the exception of the " least ones," manages to raise a crop, and laughs with the " furriners " at the saying that mountain farmers have one leg shorter than the other because of their labours in the tilted fields. Round these fields are often " deadened " trees, showing where the farmer has girdled them by cutting rings sufficiently deep to prevent the sap from rising. In this way the all important corn-crop is not shut off from the light.

The mountaineers' homes are clustered on the " bottom " wherever it is sufficiently broad, or on the lower slopes as near as possible to the creek. The most picturesque dwelling is the one-roomed log-house, the commonest kind of mountain building. It is often about fifteen feet square, with a chimney built at one end, and an ever-open door because of the absence of windows. Many have gardens, where grow melons, pumpkins, potatoes—sweet and Irish—and a few hardy flowers. There are old orchards, too, where the apple and peach trees are left shaggy and neglected, but, with their bee-hives made of hollow gum-trees, they make a picturesque setting for the low houses, where, hanging to dry on the outside walls, may be seen tobacco, or, more often, beans, and a saddle or two ready on a peg. Through the door may be caught glimpses of the many beds with bright patch-work quilts, the simple home-made hickory furniture, and, perhaps, a spinning wheel and loom.

The creek itself, winding in zig-zags great and small round mountain spurs confusingly alike, is, in dry weather, a tiny uncertain trickle, but, after heavy rains, there is a rushing " tide," which makes it easy to understand how the stream has cut its deep valley. At some places the steep banks show the almost horizontal stratification of the bed-rock. Roadside coal mines are quite common, and save the mountaineer from the worries of the city house-holder, who is constantly threatened with a coal shortage.

On the hillside, not far from the dwelling places of the living, are the little graveyards, where, to protect them from rooting animals, the graves have little shelters of latticed wood surmounted by sloping roofs, the whole about four feet high.

The mountaineers are of Anglo-Celtic stock, the descendants of settlers who moved westward after the Revolution, in 1780-1810. In some districts the Scotch-Irish predominate, in others the English, and, in a few places, those who are probably of German origin. All are native-born, and are often typically Anglo-Saxon in appearance, fair-complexioned and sturdily graceful. They are intensely individualistic and impatient of control; each is a law to himself, and does not easily extend his sympathies beyond his numerous kin. Feuds are dying out, but some are still kept up from one generation to another, and are Corsican in their venom and methods. " Moonshining " is regarded by the outsider as another characteristic mountain occupation, the making of illicit whiskey being an assertion of the mountain man's rights to do what he pleases. Co-operation is not highly developed among these people, for each man is able to support himself by the work of his own hand, nor is "swapping" horses—a very common deal—conducive to a nice regard for the rights of others. They are hot-blooded and jealous of their rights, and see no need of self-control. But these traits may be regarded as the exuberance of that spirit of independence so characteristic of citizens of the United States of America—an independence here run wild. On the other hand, the mountaineer is singularly lovable when understood. As a host his hospitality is unbounded, even to strangers, and his generosity is matched only by his dignified courtesy. The passing horseman who greets him with the familiar "Howdy," gets the reply, "You better get down and stay the night with us," and the request is pressed after more than one refusal. All payment is usually deprecated, and the guest is treated to the best his entertainer can bring forth.

It is among these people that the Caney Creek Community Centre is established, and it sends out workers to help communities to organize themselves and to build schools. No new school is opened without the request and co-operation of the district concerned, and the aim is to help the people to assume responsibility for their own communities. The ingenuousness of the children, unspoiled by the over-stimulation of city life, makes them a joy to teach; their intelligent conversation and their interest in serious things surprises those who have dealt only with children living surrounded by modern conveniences. These children grow up able to speak in crusades to the cities in the North on behalf of the needs of their kinsmen and of the need for world-service from world-citizens—surely a fine message from a remote cleft in the mountains of Kentucky.

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Campbell, O., and Sharp, Cecil and J. "English Folk Songs from the Southern Appalachians." New York, 1917.

A Land of Opportunities. E. J. Stuart. pp xiv + 144, 23 x 15 cm, many photo illustrations, folder map. London: John Lane, Bodley Head, 1923. 10/6.

An account of the Stuart-Cockram expedition to explore, especially for minerals, the Northern territories of Australia, and as such very welcome, for we hear more of the region in political discussion about the "White Australia" ideal than in any descriptions of the continent. The book tells us a good deal of the potential wealth of the Northern Territory, of its adaptability to cultivation of cotton and rice on the large scale, while endless tropical fruits might be grown in abundance. There appears to be extremely rich iron ore, not to mention other minerals. Again, the sea hath its pearls and its possibilities of enormous fisheries and canning of their products, and the author rightly insists on the fine commercial position of the Territory. The book is a partially edited diary, not an argument, and the expedition was out for films of native life as well as for commercial chances. The frontispiece is a diagram headed, "The Urgent Need of White Population," and someone writing under a pseudonym, at the end, pleads for settlers. The book, however, makes little contribution to the problem involved, indeed, one of the only remarks on the subject is, "Climate to a Briton is no obstacle," a very dubious doctrine! There is no doubt of the potentialities of Northern Australia, there is no doubt of Australia's fervent desire to keep away "coloured" labour and its attendant problems. Unfortunately there is little prospect of a real white population. The discussions by Leonard Hill (Medical Research Council, No. 52) should be studied.

ERRATUM.

In many copies of this issue on p. 185, 3 lines above the foot of the page, a line as follows has been omitted:—

"the wide, deep, and striking clay-bottomed vale now occupied by the upper"

NOTES ON THE TRADE IN SPICES, GUMS, AND AROMATICS, WITH A MAP TO ILLUSTRATE THE TRADE IN 1584.

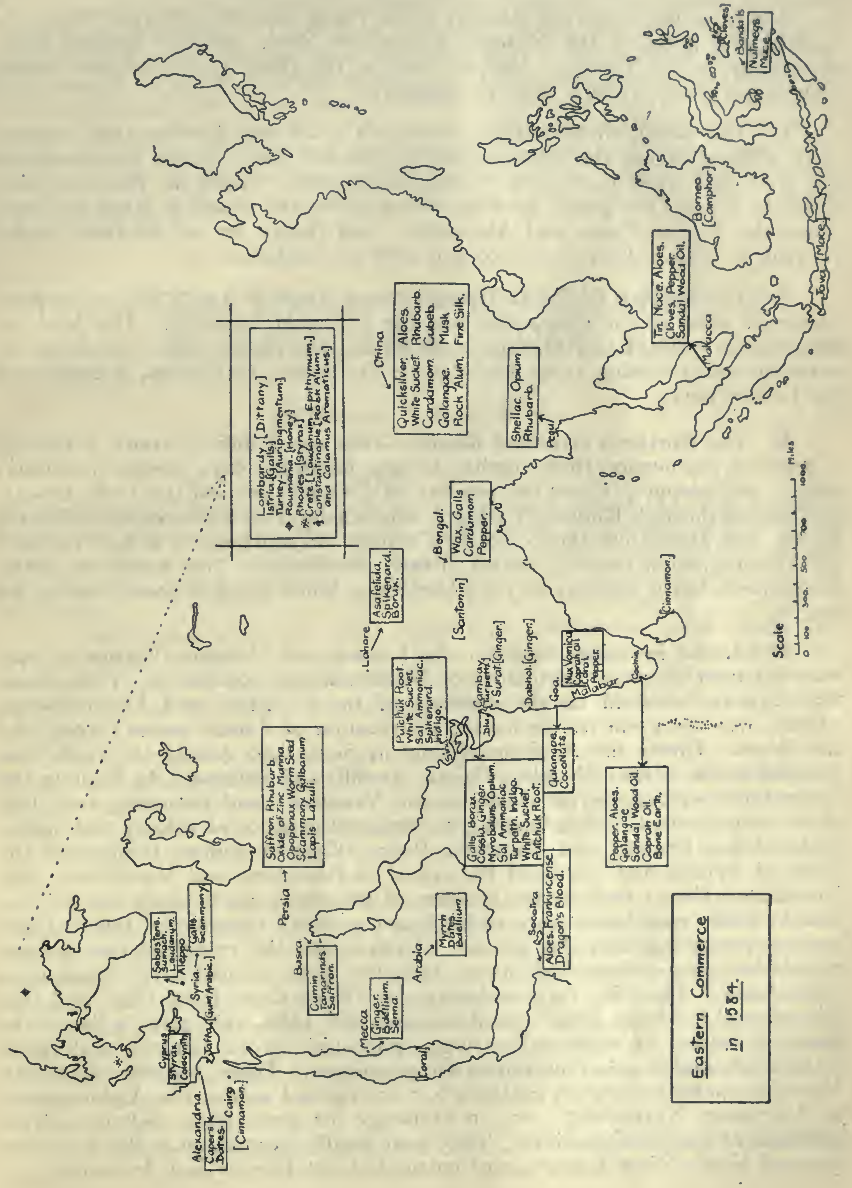
By W. J. H. Watkins, Stretford Secondary School, Manchester.

THE accompanying map has been compiled from the writings of William Barret, who was British Consul at Aleppo in 1584. This document of Barret's provides a remarkably comprehensive survey of Eastern commerce at that time, and it will be seen that the majority of the commodities mentioned are spices, gums, and aromatics. Together with silk, these commodities had formed the basis of an age-long commerce between East and West, and the great trunk routes of that commerce converged on to the Levant coast, which owing to its unique geographical situation on the Great Sea of antiquity, formed the meeting place of East and West, and the scene of a busy and fruitful intercourse between Asia and the Western World.

The beginnings of this trade are shrouded in mystery. The reasons for its existence are much less obscure. The demand for incense and spices has always been a powerful incentive to human endeavour. It was essentially a luxury trade. In very early times it had a close connection with religious rites (one writer has asserted that international trade began largely on a religious basis), and it is probable that the first demand for incense and spices arose for the service of the temple, and that the demand to supply the luxury of the palace was a later one. It is significant that the incense trade was mixed up with all sorts of superstitions. Thus the precious frankincense was obtained from a tree held to be animate and divine, and its collection was dangerous on account of the serpents which guarded the tree. This danger could be averted by the use of the gum known as storax, and it is a fact of great interest to find that there was a regular trade in this substance between the Mediterranean and India. There was a great market for gums and spices in Ancient Egypt, where they were extensively used in the temples, and for embalming the dead. The Romans were prodigal in their use of these substances, and a fabulous store of spices was burned at the funeral of Sabina Poppæa, not merely for show, "but to provide Nero's consort with a countless array of protecting spirits in the underworld." In the Middle Ages their use was general throughout Western Europe, although their prohibitive cost placed them beyond the reach of all but the very richest. In addition to being used in religious ceremonial, they were employed (a) in the compounding of drugs and medicines; (b) in mediæval cookery. Fresh meat was scarce, and the monotonous diet of salt meat was rendered more palatable by "a charitable mantle of Oriental seasoning"; (c) to counteract the evil smells due to bad sanitation; (d) and finally, gums were largely in demand for artistic and industrial purposes, as they were used in the manufacture of paints and dyes, varnishes and lacquers.

The demand for spices, gums, and aromatics was both steady and extensive, and these substances were among the main articles of ancient commerce. That the trade was one of great antiquity may be gathered from the reference in Genesis to the caravans going down to Egypt, laden with spicery and balm and myrrh. The principal regions of production were the

Malay Archipelago, the Malabar Coast of India, Ceylon, the Hadramaut Coast of Arabia, and Persia. So far as the Asiatic traffic was concerned, it was almost entirely in the hands of the Arabs and Persians. The Sabaeans of South Arabia carried on an active commerce with Western India as early as the 10th century B.C., and Arab merchants were definitely settled at Canton about 300 A.D. The Chinese do not appear to have gone very far afield as traders, but contented themselves with levying substantial duties


Eastern Commerce in 1584.
Lombardy. [Dittany.]
Istria-[Galls.]
Turkey-[Auripigmentum.]
◆ Roumania-[Honey.]
Rhodes-[Styrax]
* Crete [Laudanum Epithymum.]
Constantinople [Rock Alum and Calamus Aromaticus.]
China
Quicksilver. Aloes. White Sucket. Rhubarb. Cardamom. Cubeb. Galangae. Musk. Rock Alum. Fine Silk.
Borneo [Camphor]
Tr. Mace. Aloes. Cloves. Pepper. Sandal Wood Oil.
Malacca
[Cloves]
Banda Is.
Nutmegs Mace
Java. [Mace]
Shellac. Opium Rhubarb.
Pegu
Bengal.
Wax. Galls Cardamom Pepper.
Lahore
Asafetida. Spikenard. Borax.
[Santonin]
Cambay [Turpeth.]
Surat-[Ginger.]
Diu
Dabhol-[Ginger]
Goa.
Nux Vomica Copra oil Coral Pepper
Malabar
Cochin
[Cinnamon]
Putchuk Root. White Sucket. Sal Ammoniac. Spikenard. Indigo.
Galls. Borax. Cassia. Ginger. Myrobalans. Opium. Sal Ammoniac. Turpeth. Indigo. White Sucket. Putchuk Root.
Galangae. CocoNuts.
Pepper. Aloes. Galangae. Sandal Wood Oil. Copra Oil. Bone Earth.
Socotra
Aloes. Frankincense Dragon's Blood.
Persia →
Saffron. Rhubarb. Oxide of Zinc Manna. Opoponax Worm Seed. Scammony. Galbanum. Lapis Lazuli.
Basra.
Cumin Tamarinds Saffron.
Arabia
Myrrh Dates. Bdellium
Mecca
Ginger. Bdellium. Senna.
Coral
Aleppo
Sebestens. Somach. Laudanum.
Syria →
Galls. Scammony
[Gum Arabic.]
Cyprus
Styrax. Colocynth
Jaffa
Alexandria.
Capers Dates.
Cairo
[Cinnamon]
Scale
0 100 200 300 500 700 1000 Miles

at the ports used by the Arabs. The commodities we are discussing are almost invariably referred to in early Chinese literature as "goods of Persia," a significant commentary on the peoples engaged in the trade. It was the Arabs and Persians who collected the spices and gums from far and wide in Eastern Asia, and conveyed them to the Levant and Egypt via the Persian Gulf and the Red Sea. They retained a virtual monopoly of the trade until the advent of the Portuguese, Dutch, and English into the Indian Ocean, following upon the discovery of the Cape Route.

The principal collecting stations of the trade were the Straits of Malacca, Ceylon, the ports of the Malabar Coast and Sind, and the Persian Gulf. According to the Venetian Marino Sanuto, the trade was conducted along three main routes, which were as follows:—

1. The Southern Sea Route.—From Ceylon and Malabar the cargoes were shipped across the Arabian Sea to the Red Sea. Along the shores of the Red Sea were numerous "designated ports," such as Berenice, and from these ports the goods were conveyed across the desert to Kus, and then down the Nile to Cairo and Alexandria, and thence by sea to Italy, or by caravan to Tunis, Fez, Morocco, and even to Timbuktu.

2. The Persian Gulf and Mesopotamian Route.—Along this route were conveyed most of the goods destined for European markets. The ports of debarkation were Kish, Ormuz, and Basra, and these were connected by caravan routes leading from Baghdad to Trebizond, Damascus, Aleppo, and the Levant ports.

3. The Northern Overland Route.—This was a difficult route, involving a perilous journey of from eighty to one hundred days across mountain, desert, and steppe. From the borders of China it crossed the Gobi Desert, and passed through Khotan, Yarkand, and Kashgar to Samarkand, Bokhara, Khiva, and Merv, and thence to the Caspian, or southwards to link up with the Mesopotamian caravan routes already mentioned. This route was often interrupted, but it appears to have been clear when Mongol power was at its height.

The traffic in spices between the Levant and Western Europe is intimately bound up with the history of Mediterranean commerce. Yver states that Cyprus, situated on the confines of the Christian and Mohammedan worlds, was the great centre for the distribution of Asiatic wares throughout the West. Under the Angevin régime in Sicily and Apulia the trade was fostered in the cities of Naples, Gaieta, Amalfi, and Salerno. At Barletta the Florentines were powerful rivals to the Venetians and Genoese, and their ships traded with Rhodes, where they obtained cargoes of spicery and cotton destined for Central and Southern Italy. Catalan sailors frequented the ports of Apulia, and conveyed the spices to Barcelona and Marseilles. But Venice and Genoa had the lion's share of the trade, particularly the former, and Venetian merchants were to be found in every commercial town of any importance throughout the Levant. Venice was the resort of the German merchants, and Simonsfeld states that the first authentic reference to a "fondacus" (hostelry for merchants) in Venice dates from 1228, and that the original fondacus was burnt down in April, 1318. He gives a list of the amazing variety of wares which was "piled up" in the fondaci, and spices of all kinds and in great quantities are prominent. These, together with such Venetian manufactures as glassware, were carried across the Alpine passes to Augsburg, Nuremberg, etc., in exchange for wool, linen, peltry, and the products of the German mines. They were finally disposed of in the numerous fairs of North West Europe, and particularly at Bruges and Antwerp.

We can only hint at some of the important results of the trade. Not only did it bring East and West into contact, but it was a potent factor in promoting intercourse between the advanced communities of the Mediterranean and the Transalpine "barbarians." It helped materially in the development of cities like Venice, Genoa, Florence, Barcelona, and Augsburg, cities whose contribution to civilisation has been rich and abiding. The quest of Cathay and the Spice Islands was one of the main incentives to exploration. They were the goal sought by the Portuguese when they rounded the Cape, and by the Elizabethan sea-dogs who attempted the North-East and North-West Passages. These men who went down to the great waters in ships carried other things than merchandise. "Ideas were as liberally interchanged as goods," writes Motley. "Truth was imported as freely as precious merchandise. The Psalms of Marot were as current as the drugs of Molucca or the diamonds of Borneo. The prohibitory measures of a despotic government could not annihilate this intellectual trade, nor could bigotry devise an effective quarantine to exclude the religious pest which lurked in every bale of merchandise, and was wafted on every breeze from East and West."

THE TEACHING OF GEOGRAPHY IN ELEMENTARY SCHOOLS.

By Ernest Young, B.Sc.

III.—THE STUDY OF A REGION.

IN the first of this series of articles it has been stated that the business of the teacher is to organise the teaching of geography in any given school so that it is a coherent whole, and it was suggested that one of the first things to decide was what "natural regions" should be dealt with in the course.

In the second article it was urged that the whole world should be covered during the school life of each pupil. This means that it is not merely the home land, but also the whole world that has to be divided up into regions suitable for the particular scheme of work on which the teacher has decided.

The selection of the appropriate regions is not a matter of rule of thumb, nor of following the lead of some expert. It could, and probably should, vary according to the special interests of the scholars and the opportunities afforded by the home district for purposes of comparison.

Having decided upon the region, what are the main facts to be taught about it?

The elements of any region are first *relief* and *climate*. It is not always, certainly never, in lower standards, necessary to explain these; they merely require description. They give the key to the natural *vegetation*, and to agricultural possibilities when exploited by either primitive or scientific farmers, and to *occupations*. In connection with all these let there be plentiful use of original sources suitable to the age of the pupils; they should have vivid pictures of the African forest from Livingstone or Stanley and of the Arctic tundra from Stefansson. Accounts of occupations should be detailed enough to show how people do actually get their living and these will lead to how people live.

How people live includes accounts of *houses, food, clothing,* modes of *transport*. Modes of transport connect up with possible land and water *routes* and hence with human *settlement*—hamlet, village, town and city with special reference to the centre of government. Plenty of pictures, lantern slides and detailed descriptions are necessary to make the region alive. In fact, if the mention of a region does not at once flash an image across the mental vision of the pupil of people living, working and moving in that region, the lessons have been a failure.

A great deal of so-called regional geography is no more than disconnected lists of names and differs only from the older types of geography in the rearrangement of the lists. True regional geography should leave an impression of the region in all its aspects so that East Anglia, or the South-East of England, or the Amazon Basin, or the Indo-Gangetic Plain is seen full of people doing things and, usually, doing them very well, given the particular circumstances of the case.

Obviously the amount of detail varies with the age. Thus, in an account of East Anglia for young children it is enough to talk of wheat-farming and to describe a typical year's work on a field where wheat is being cultivated, but older children, studying the same region should learn that the wheat farmer grows other things besides wheat and should obtain some knowledge of the rotation of crops.

The amount of detail will also vary with the character of the home region. The son of the farmer needs to hear more of the life of the miner or the sailor than of his own district. The dweller in a chalk land needs greater detail of the life in the Scotch highlands than do those who dwell there. Inland children know little of ships, coast children little of ploughs and harrows.

And, in all cases, different methods of approach may be adopted for any given region. Logic would say begin with structure and go on through relief, climate and vegetation, etc., in a definite order. But logic, as such, makes little or no appeal to young children and moreover, nothing in life is logical and the end of all logic, pursued to the bitter end, is some form of lunacy. The line of approach, the point of attack, is that which is most likely to interest the child. It is better to begin an account of the Congo forest with the pigmy and explain him than to begin with the climate and deduce him. Says Rousseau, "Things themselves are the best explanation." Purely logical methods have their place in a university scheme but not, necessarily in an elementary school.

In the upper classes one can add other elments—*economic, political* and *historical*; this suggests that it is not only the amount of detail that will increase in quantity but also that ideas that have a geographical foundation will increase in difficulty. Quite young people can understand the idea of a nodal point where a town develops though quite incapable of appreciating like elder children, the difference say in opinion between Eastern and Western Canada on the question of Chinese immigration, while a theory like that of Vaughan Cornish on the isothermal frontiers of ancient cities has no place at all in an elementary course.

Teachers in doubt as to what to include in their regional treatment might profitably read "The Scope of School Geography" by Brown, Howarth and McFarlane. It deals with secondary school geography, but much of what it contains applies to elementary school geography also.

Teachers who are interested in the general question are advised to read:—

Geographical Teacher, Vol. 3, p. 104. "The Natural Regions of the World." A. J. Herbertson.

Geographical Teacher, Vol. 7, p. 158. "Natural Regions." A. J. Herbertson.

Geographical Journal, Vol. 48, p. 230. "A synthetic Method of Determining Geographical Regions." J. F. Unstead.

Scottish Geographical Magazine, Vol. 35, p. 94. "Human Regions." H. J. Fleure.

SOME RECENT ARTICLES OF GEOGRAPHIC INTEREST.

Prepared by R. A. PELHAM, Univ. College, Wales, Aberystwyth.

THIS list continues from list in Geographical Teacher, Vol. XII, pages 301—305 (Spring, 1924). It covers the following publications:—

GJ—Geographical Journal, Jan.-April, 1924. SGM—Scottish Geographical Magazine, Jan.-March, 1924. AGR—American Geographical Review, Jan.-April, 1924. J of G—Journal of Geography, Sept., 1923-April, 1924. AdeG—Annales de Géographie, Jan., 1924. Z—Zeitschrift der Gesellschaft für Erdkunde, Berlin, 1923 Nos. 8-10, 1924 Nos. 1-2. PM—Petermann's Mitteilungen, 1923 Nos. 9-10, 1924.

EUROPE.

Dudley Buxton	AGR, Jan., 1924	Malta; an Anthropological Study (conditions influencing demography of island—map).
J. Levainville	AGR, Apl., 1924	The Economic Geography of the Rhine (canal systems and trade-maps).
———	AGR, Apl., 1924	Terrestrial Reorganisation in European Russia (map of administrative divisions and races).
S. Novakovsky	JofG, Oct., 1923	Natural Resources of Russia.
,,	JofG, Mch., 1924	Natural Resources of Poland.
Em. de Martonne	AdeG, Jan., 1924	Need for 1/50,000 Map of France.
L. Gachon and A. Richard	AdeG, Jan., 1924	Massif du Livradois (Plateau Central-physiography, occupations, demography).
A. Angot	AdeG, Jan., 1924	Eruption of Mt. Etna, May—June, 1923.
J. Maurain	AdeG, Jan., 1924	Fairs and Markets of Mortain (Normandy).
A. Demangeon	AdeG, Jan, 1924	Dordrecht (waterways and industrial activities).
E. Nowack and H. Lewis	Z, No. 8-10, 1923	Travels in Albania (Topographical description).
A. Philippson	Z, No. 8-10, 1923	Newer literature on the Prussian Rhineland (Bibliography and general review).
E. Nowack	Z, No. 1-2, 1924	Travels in Albania (continued from previous number and concluded).
S. Rudryckyj	Z, No. 1-2, 1924	The Ukraine (A survey of the present population and economic life of this constituent of the Federation of Socialist Republics. The great decrease of large estates and growth of peasant proprietorship is brought out).

A. Burchard	PM, Dec., 1923	Steps in Alpine valleys, especially Getztal (conclusion of an article in previous number. Emphasizes the point that in the Alps ice worked on valleys already created by water and greatly sharpened the pre-existing contrasts between basins and waterfall-narrows).
F. Leydon	PM, Dec., 1923	Movements of Population in Flanders 1912-20 (Diminution of population in war zone and generally W. of Scheldt, marked increase E. of Scheldt in many districts. Bibliography and Reviews of recent literature on U.S.A., Mexico and Cent. America, also bibliography on W. Indies and parts of S. America).

ASIA.

Sir C. Bell	GJ, Feb., 1924	A Year in Lhasa (customs, religion etc—illust.—of note on pp. 170-1).
W. Weston	GJ, Feb., 1924	Influence of Nature on Japanese Character (agriculture, superstitions etc-illust).
E. H. Keeling	GJ, Feb., 1924	Damascus—Bagdad Motor Route.
J. B. Mackie	GJ, Mch., 1924	Hasa, an Arabian Oasis (near Persian Gulf—trade, demography, mode of life).
C. Davidson	GJ, Mch., 1924	Distortion of Sea Bed in Japanese Earthquake of September 1st, 1923 (map).
Sir A. Kennedy	GJ, April, 1924	The Rocks and Monuments of Petra (Nabataean civilisation S. of Dead Sea—map and illust).
L. S. Fortescue	GJ, April, 1924	The Western Elburz and Persian Azerbaijan (Persia as a land of contrasts—illust).
W. H. Wood	SGM, Jan., 1924	Rivers and Man in Indus-Ganges Alluvial Plain (changes in course of rivers—sketch maps—precarious position of Calcutta).
M. L. Fuller and F. G. Clapp	AGR, Apl., 1924	Loess and Rock Dwellings of Shensi, China (illust).
F. K. Morris	AGR, Apl., 1924	Notes on Mapping Program of 3rd Asiatic Expedition in Mongolia (map and diagrams).
A. Bernard	AdeG, Jan., 1924	Populations of Syria and Palestine (1922 census figures of races and religions).
J. Sion	AdeG, Jan., 1924	Recent works on structure of N. Indo-China.
W. A. Obrutschew	Z, No. 8-10, 1923	The Dzungarian Gate pp. 241-265 (A geological and physical review with comments on Suess. Mountain formations connected with the Tienshan rather than with the Altai).

AMERICA.

J. Russell Smith	SGM, Mch., 1924	The Reindeer Industry in America (its development—economic problems).
T. T. Waterman	AGR, Jan., 1924	North American Indian Dwellings (ethnology—map and illust.).
M. Jefferson	AGR, Jan., 1924	New Rainfall Maps of Brazil (former work on subject discredited—map and statistics—see note on drought area on p. 142).
C. H. Birdseye & R. C. Moore	AGR, Apl., 1924	A Boat Voyage through the Grand Canyon of the Colorado (geomorphology—map, block diagrams and illust).
F. J. Alcock	AGR, Apl., 1924	Across Gaspé (mouth of St. Lawrence—topography, occupations etc—map and well illust).
W. D. Durland	AGR, Apl., 1924	The Quebracho Region of Argentina (water supply and account of lumbering industry—maps and statistics).
J. H. Sinclair	AGR, Apl., 1924	Notes on the Mapping of an Area in Southern Honduras (topography)
A. Foster	JofG, Sept., 1923	Barbados (trade and occupations—problem of dense population—bibliography).
P. E. James	JofG, Oct., 1923	The Upper Parana Lowland (problems of railway development—map and illust—see article by Durland in AGR April, 1924).
W. O. Blanchard	JofG, Oct., 1923	An Energy Map of the U.S. (map and statistics of power production).
W. H. Haas	JofG, Nov., 1923 (Special No.) Dec., 1923.	Studies in the Geography of Brazil (factors impeding development—regional survey with special reference to activities).
G. R. Coxe	JofG, Nov., 1923	Brazil's Foreign Trade.
W. O. Blanchard	JofG, Dec., 1923	Foreign Trade Routes of Bolivia (railways to Pacific and Argentina).
P. E. James	JofG, Dec., 1923	The Transportation Problem of Highland Colombia (rail and river routes—map).
W. O. Blanchard	JofG, Jan., 1924	Some Geographic Factors affecting Agriculture in Illinois. The Agricultural Provinces of Illinois (maps of products).
L. A. Case	JofG, Jan., 1924	The Valley of Chin Lee (mode of life etc. of Indians in New Mexico—illust).
H. M. Strong	JofG, Apl., 1924	The Geography of the Northern Interior of the U.S. (mainly economic—several maps and statistics).

C. Rondon	AdeG, Jan, 1924	Exploration in Matto Grosso (geomorphology, flora, demography—geology map).
R. Stappenbeck	Z, No. 1-2, 1924	Chicamo Valley in N. Peru (topography, geomorphology, climate, vegetation, ethnology and demography).
F. Hupfeld	Z, No. 1-2, 1924	Heights of Places in Colombia (commercial and other work of former German Togoland Society—short abstract).

AUSTRALASIA.

O. H. T. Rishbeth	SGM, Mch., 1924	Railway Development as symbolising ideas of Social Construction (special reference to Australia—maps).
A. Leber	PM, Dec., 1923	Across Admiralty Is. in 1914 (Topography, Demography. and Economic Possibilities).

EAST INDIES.

M. Reinhard	GJ, Feb., 1924	S.E. Coast of British N. Borneo (physiography and geology—maps and bibliography).

POLAR REGIONS.

Sir C. Close	GJ, Feb., 1924	Supposed Westerly Drift of Greenland (former observations challenged).
J. S. Huxley & N. E. Odell	GJ, Mch., 1924	Notes on Surface Markings in Spitzbergen (stone and fissure polygons—diagrams and illust—references).
R. T. Gould	GJ, Mch., 1924	The Ross Deep (Ross's soundings held to be false).

AFRICA.

J. C. Statham	GJ, Jan., 1924	From Mossamedes to the Victoria Falls (flora, fauna, ethnology, irrigation scheme for N. Damaraland—map and illust).
H. C. Maydon	GJ, Jan., 1924	Across Eritrea (contrasts between E. and W. Climate zones—map and illust).
Comte Byron Khun de Prorok	GJ, Mch., 1924	Recent Researches on the Peninsula of Carthage (evidence of successive civilisations—map and illust).
R. Maack	Z, No. 1-2, 1924	Tsondab desert and its hill frame in S.W. Africa (regional description based on travel—topography and geology, drainage, vegetation, etc).
D. S. Whittlesey	AGR, Jan., 1924	Geographic Provinces of Angola (Regional outline with full references to sources—map).

S. Passarge	PM, No. 9-10, 1923	The Residual Hills in the landscape of the Masai steppe. A rather curious and hostile review of a small portion of a work by E. Obst describing his travels in E. Africa. Passarge's article is mainly concerned with processes of denudation as observable in the Masai steppe. E. Obst sends a sharp retort to the Passarge Article).

GENERAL AND UNCLASSIFIED.

W. Bowie	GJ, Jan., 1924	Abnormal Densities in Earth's Crust disclosed by analysis of Geodetic Data.
A. Alessio	GJ, Jan., 1924	Doubts and Suggestions on Terrestrial Isostasy.
A. T. Doodson	GJ, Feb., 1924	Tides and Work of Liverpool Tidal Institute (diagrams of co-tidal and co-range lines for British Seas).
Perm. Cttee. Geog. Names	GJ, Feb., 1924	Place Names in the Irish Free State (few official changes).
D. W. Freshfield	GJ, Mch., 1924	The Conquest of M. Everest (a few suggestions to ensure success).
P. K. Boulnois	GJ, April, 1924	Field Longitudes by Wireless (an asset to exploration in tropics).
Jovan Cvijic	AGR, Jan., 1924	The Evolution of Lapiés (karst physiography—special reference to Dalmatia —diagrams and well illust—see note on pp. 145-6).
R. de C. Ward	AGR, Jan., 1924	A Cruise with the International Ice Patrol (safeguard for trans-Atlantic ships—maps and illust).
I. Bowman	AGR, Jan., 1924	The Muhammadan World (its location on Old World deserts—paucity of economic resources—maps).
R. Blanchard	AGR, Jan., 1924	Geographical Conditions of Water-Power Development (advantages of glaciated regions—analysis of conditions in U.S.A. and France).
C. Schoy	AGR, Apl., 1924	The Geography of the Moslems of the Middle Ages (largely mathematical).
E. A. le Lacheur	AGR, Apl., 1924	Tidal Currents in the Open Sea (observations off Nantucket Island—diagrams).
R. M. Harper	JofG, Sept., 1923	To What Extent does Topography Control Civilisation? (influence on agriculture, mainly in U.S.A.).
S. T. Bratton	JofG, Jan., 1924	National Grouping of Population Density (according to physical regions, occupations, etc.).
J. B. Strate	JofG, Mch., 1924	Mark Twain and Geography.
A. G. Ogilvie	SGM, Mch., 1924	Modern Geography as a Study and as an Aid.

SPECIAL NOTE.—Teachers will find in the "Journal of Geography" numerous articles dealing with geographical teaching in American schools.

THE GEOGRAPHICAL ASSOCIATION.
(TOURING BRANCH.)

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PROGRAMME OF SUMMER TOURS, 1924.

BRITISH TOURS.
(By Motor Coach).

TOUR No. 1.—July 26th to August 4th inclusive. (Starting from BRADFORD).

Ten Days Tour to The West Coast of Scotland, The Scottish Highlands, and The English and Scottish Lake Districts.

Conducted by E. E. LUPTON, Esq., F.R.G.S.

1st Day.—Bradford, Aire Gap, Ribblesdale, Lonsdale, Shap Fells, Eden Valley, Carlisle.

2nd Day.—Dumfries, Castle Douglas, Newton Stewart, Wigtown Bay, Glenluce, Stranraer.

3rd Day.—West Coast of Wigtownshire and Ayrshire, Girvan, Ayr, Burns' Country, Glasgow.

4th Day.—The Clyde, Helensburg, L. Lomond, Crianlarich, Dalmally, Pass of Brander, Oban.

5th Day.—Loch Awe, Glen Dochart, Glen Ogle, Pass of Leny, Callander.

6th Day.—Loch Katrine (Trossachs), Lochearnhead, Killin, Loch Tay, Aberfeldy, Pitlochry, The Pass of Killiecrankie.

7th Day.—S. Highlands, Sidlaw Hills, Perth, The Ochils, Stirling, Bannockburn, Edinburgh.

8th Day.—Half-day at Edinburgh, thence to Melrose, Selkirk, Ettrick Vale, St. Mary's Loch, and Moffat.

9th Day.—Beattock, Annandale, Gretna, Carlisle, Keswick, The English Lake District to Ambleside.

10th Day.—Windermere, Grange-over-Sands, The Pennines, Ingleton, Settle, Ilkley, Bradford.

Inclusive Fare for this Tour:—

Members, £15. **Non-Members, £16.**

The fare includes Motor, First Class Hotel Accommodation, All Meals, and All Gratuities, **and is conditional on the party numbering 22 or over.**

For **Conditions of Booking** and **Booking Fees** see following pages.

TOUR No. 2.

At the request of many Members and Friends, the Committee has decided to Revise and Re-organise Tour No. 2 as follows:—

9 Days' Motor Tour through the Natural Regions of Central and South Britain,

Including the South Coast of Hampshire and Dorset, Shakespeare Land and The Peak District,

WITH 2 FULL DAYS AT THE EMPIRE EXHIBITION AT WEMBLEY.

Wednesday, August 6th, to Thursday, August 14th, inclusive.

ITINERARY.

1st Day.—Bradford, Doncaster, The Dukeries, Nottingham, The Midland Plain, Fenland, Peterborough.
2nd Day.—Bedford, Valley of Gt. Ouse, Woburn, The Chilterns, St. Albans, London.
3rd Day.—At the Empire Exhibition and back to London.
4th Day.— ,, ,, ,, ,,
5th Day.—Surrey Heathlands, Bagshot, Aldershot, Alton, Winchester, The New Forest, Bournemouth.
6th Day.—At Bournemouth, and to Lulworth Cove and the Dorset Coast.
7th Day.—Salisbury, Stonehenge, Salisbury Plain, Marlborough, The Downs, Vale of White Horse, Oxford.
8th Day.—Woodstock, The Cotswolds, Stratford-on-Avon, Warwick.
9th Day.—Kenilworth, Coventry, The Midlands, Derby, Matlock, Chatsworth, South Pennines, Sheffield, Bradford.

Inclusive Fare:—Members, 12 gns.; Non-Members, 13 gns.

This Fare includes—Motor, 1st Class Hotels, all Gratuities, Conveyance to Wembley, and Admission to the Exhibition, **and is conditional on the party numbering 24 or over.**

Applications and Bookings to be made to—
Mr. E. E. LUPTON, F.R.G.S., Hon. Sec., 73, Bierley Lane, Bradford,
by June 30th.

FOREIGN TOURS.

TOUR No. 3.

"23 Days' Tour to Lucerne and The Bernese Oberland,"

August 4th to August 26th inclusive.

Conducted by P. H. L'ESTRANGE, Esq., B.A.

ITINERARY.

	Night at
Aug. 4th.—Leave London, 2-0 p.m.	
,, 5th.—Arrive Lucerne. Visit to Glacier Garden, etc.	Lucerne.
,, 6th.—Excursion to Rigi or Pilatus.	,,
,, 7th.—Excursion to Burgenstock.	,,
,, 8th.—Steamer to Tell's Platte. Walk along Axenstrasse to Fluelen; train to Wassen	Wassen.
,, 9th.—Train to Göschenen; walk to Andermatt.	Andermatt.
,, 10th.—Excursion to St. Gotthard Pass (motor optional).	,,
,, 11th.—Excursion to Oberalp Pass.	,,
,, 12th.—By diligence over Furka Pass to Gletsch.	Gletsch.
,, 13th.—Visit to Rhone Glacier.	,,
,, 14th.—By diligence over Grimsel Pass to Meiringen.	Meiringen.
,, 15th.—Visits to Aar Gorge and Reichenbach Falls.	,,
,, 16th.—To Interlaken and Lauterbrunnen.	Lauterbrunnen.
,, 17th.—Excursion to Murren, return via Stechelberg.	,,
,, 18th.—Visit to Trümmelbach Falls and upper part of valley.	,,
,, 19th.—Excursion to Wengen.	,,
,, 20th.—Train to Klein Scheiddeg, visit Eiger Glacier and snow-field, walk to Grindelwald.	Grindelwald.
,, 21st.—Excursion to Bäregg Hut and Lower Glacier.	,,
,, 22nd.—Walk to Manlichen—train from Kl. Scheiddeg.	,,
,, 23rd.—Ascent of Faulhorn.	,,
,, 24th.—Walk to Grosse Scheidegg—visit Upper Glacier and Ice Grotto.	,,
,, 25th.—Visit to Lütschen Gorge. Leave Grindelwald.	
,, 26th.—Arrive Victoria (London) 3-20 p.m.	

TOUR No. 4.

"23 Days' Tour to The Swiss Engadine and Lake Como, etc."

August 4th to August 26th inclusive.

Conducted by Dr. NAEGELI (University of Zurich).

	ITINERARY.	NIGHT AT
Aug.	4th.—Leave London (Victoria, S.E. side), 2-0 p.m.	
,,	5th.—Arrive Zurich. Sight seeing.	Zurich.
,,	6th.—Walk or train to Uetliberg. Train to Arosa.	Arosa.
	7th.—Walk to the Aelplisse. Afternoon walk to Maran.	,,
	8th.—Ascent of Weisshorn.	,,
,,	9th.—Over the Urdenfuerkli to Parpan; motor car to Tiefenkastel; train to Pontresina.	Pontresina.
,,	10th.—Rosegg Glacier (train optional).	,,
,,	11th.—Bernina Pass (train) Sassal Masone Alp; Palue Glacier to Alp Gruem Station, train to Pontresina.	,,
,,	12th.—Muottas Murail (train optional).	,,
,,	13th.—Diavolezza, Morteratsch Glacier (with guide) train back to	,,
,,	14th.—Half-day's walk to St. Moritz.	,,
,,	15th.—Fuorcla Surlej to Silvaplana or Sils.	Silvaplana.
,,	16th.—Rowing on Lake Silvaplana or Sils.	(Sils).
,,	17th.—Walk to Fextal and Fex Glacier.	,,
,,	18th.—Morning walk to Marmorè. Afternoon walk to Chastè.	,,
,,	19th.—Pizdella Margna (for good walkers).	,,
,,	20th.—Maloja (motor boat), Lake of Cavloccio, back to Maloja, walk along Lake to Sils.	,,
,,	21st.—To Maloja and Chiavenna (diligence).	Chiavenna.
,,	22nd.—Train to Colico; Steamer to Bellagio.	Bellagio.
,,	23rd.—Morning to Serbelloni (beautiful park); Afternoon Boat to Villa Carlotta.	,,
,,	24th.—Steamer to Como. Train to Lucerne.	Lucerne.
,,	25th.—Lucerne, Glacier Garden, etc. Leave for England.	
,,	26th.—Arrive Victoria, 3-20 p.m.	

Inclusive Fares:—Tour No. 3, Members, 25 gns.; Non-Members, 26 gns.
Tour No. 4, Members, 26½ gns.; Non-members, 27½ gns.

N.B.—These fares are subject to the party numbering at least 25; if less than that number, One Guinea more will be charged.

The fare includes 2nd Class Travel, 1st Class on Steamers, 3rd Class on Mountain Railways; Full Hotel Accommodation at Superior Hotels; All Meals, All Gratuities, Kurtax, and conveyance of luggage where necessary, and services of Guides and Lecturers.

The tickets are valid for 33 days, and Members may extend their stay if desired up to that limit.

NOTE.—The walks are not too strenuous, and all walking or excursions are optional.
At each centre and en route addresses and lectures will be given.

All further particulars of Tours 3 and 4 may be obtained from:—

Miss L. LEE, F.R.G.S., 'Melford,' Walpole Road, Boscombe, Bournemouth.

(Enclose stamped addressed envelope for reply).

TOUR No. 5.

15 Days to "The Paris Basin and the Backgrounds of its Life in Brittany and Normandy."

August 1st to August 15th inclusive.

Conducted by Miss S. HARRIS, F.R.G.S.

(Assistant Lecturer in Geography, University College of Wales, Aberystwyth).

ITINERARY.

		Night at
Aug.	1st.—London to Southampton. Steamer to Cherbourg. Train to Dinan.	Dinan.
,,	2nd.—Excursions to Mt. St. Michel and St. Malo.	,,
,,	3rd.—At Dinan. Train to Morlaix.	Morlaix.
,,	4th.—At Morlaix. Visit to Roscoff. Train to Quimper.	Quimper.
,,	5th.—Morning at Quimper. Afternoon train or motor to Lorient	Lorient.
,,	6th.—Visit to Carnac. Afternoon to Vannes.	Vannes.
,,	7th.—Vannes—Angers—Tours.	Tours.
,,	8th.—Tours—Blois—Chartres.	Chartres.
,,	9th.—At Chartres. Chartres to Paris.	Paris.
,,	10th.—In Paris and environs.	,,
,,	11th.— ,, ,,	,,
,,	12th.—Paris to Rouen.	Rouen.
,,	13th.—At Rouen.	,,
,,	14th.—Rouen to Le Havre.	
,,	15th.—Le Havre to Southampton and London. Arr. 9-15 a.m.	

Inclusive Fare:—Members—18½ guineas. Non-Members, 19½ guineas.

This fare includes 3rd Class travel to Southampton, 2nd Class in France, 1st Class on Steamers (with berths when obtainable). Hotel accommodation with Continental breakfast, lunch and dinner, all gratuities, taxes, conveyance of luggage where necessary, and excursions to Mt. St. Michel, St. Malo, Roscoff, and Carnac.

The above fare is based on a minimum of 25 passengers. If less than this number book, the fare will be £1 more.

For further particulars of this tour apply to Miss S. Harris, Dept. of Geography, 11, Marine Terrace, Aberystwyth. (Enclose stamped envelope for reply).

CONDITIONS FOR BOOKING, &c.

1. The number of passengers on the British Tours is limited to 24 per tour, and bookings are accepted in strict order of application. Each tour will be accompanied by a Lecturer, who will give his services in indicating and explaining all the interesting Geographical problems, etc., met with en route.
2. Every care will be taken to ensure the safety and comfort of the Members, but it must be understood that no liability whatsoever is accepted by the Committee for loss of tickets, luggage, or other property; nor for personal injuries or sickness occasioned by accident, weather, detention or any other cause.
3. The Programme and Routes will be adhered to unless there are urgent reasons to the contrary; but the right to alter any of the routes is expressly reserved if considered expedient. It is impossible to guarantee that any particular route will be followed, or that accommodation will in every case be found at the particular hotel advertised.
4. Special accommodation is provided on the Motor Coaches for luggage, but the Committee accepts no responsibility in any form for the conveyance or safety of members' luggage. It is strongly urged that hand luggage only be taken. The parties cannot on any account be delayed for the convenience of members bringing unwieldy luggage.
5. A Booking Fee of **FIVE POUNDS** is required at the time of Booking; the balance to be paid **one month** before the date of the commencement of the tour.
6. If, owing to unforeseen circumstances, a tour should be abandoned by the Committee, all payments will, except otherwise stated, be returned in full.
7. Members who have urgent reasons for withdrawal, may generally do so, except where otherwise stated, up to within one month before the tour commences for which entry has been made. If a substitute can be provided the deposit may be returned in full. Otherwise a fee of 10/- will be retained for cancellation expenses.
8. Intending passengers are asked to communicate as follows:—
    (a) For further particulars and itinerary of the Swiss Tours to
    Miss L. LEE, F.R.G.S., 'Melford,' Walpole Road, Boscombe, Bournemouth.
    (b) For particulars of the French Tour to
    Miss S. HARRIS, F.R.G.S., 11, Marine Terrace Aberystwyth.
    (c) For particulars of the British Tours, etc., and **ALL BOOKINGS FOR ALL TOURS** t **Mr. E. E. LUPTON, F.R.G.S.,**
    73, Bierley Lane, Bradford, Yorks.

(Enclose stamped addressed envelope for reply).

REVIEWS.

Exercises on Ordnance Maps. By C. H. Cox. pp. 47 (exclusive of pages for notes), 24½ x 15½ cm. Bell. 1/9.

As far back as January, 1920, a suggestion was made in these pages that the O.S. Pamphlet describing small scale maps provided useful samples of various kinds of maps for class use, particularly in those cases where financial considerations prevented the purchase of a variety of complete sheets. Many educational institutions have bought supplies of the above pamphlet, together with its large scale companion. The maps of those pamphlets are included and used by Mr. Cox for his exercises. It is a very cheap, well-produced work, and is strongly recommended to those teachers who desire elementary and advanced exercises in map spelling and map reading. Several of the exercises require additional material for their complete answer, but practically all are based on the included maps. The number of exercises is large, and repetitions are inevitable, but a pupil who can solve a bare majority of them must have a sound knowledge of map reading. The book is strongly recommended. W.E.W.

Annals of the Association of American Geographers. Volume XIII, Nos. 1—4. 27 x 20½ cm. 75 cents. each.

The attention of teachers, desiring detailed and authoritative information on certain aspects of American geographical work, is called to the above quarterly. It is quite distinct from the "Geographical Review" published by the American Geographical Society, and caters for a different circle of readers. The numbers are published in March, June, September and December, and the subscription is $3 per annum. The parts are of slightly different size, but Volume XIII, 1923, has a total of 223 pages. The articles for 1923 deal principally with agricultural and climatological matters. The agricultural topics for 1923 are "Soils of the Great Plains" (Marbut, 26 pp); "Natural Vegetation of the Great Plains" (Shantz, 27 pp); "The Agriculture of the Great Plains" (Baker, 57 pp). All these are by admitted experts, and the articles are well illustrated. The climatological articles consist of "Climate of the Great Plains" (Kincer, 14 pp) and two of general interest by Visher on "Laws of Temperature" (26 pp); "Laws of Wind and Moisture" (38 pp). Readers who have made use of Prof. Visher's article in the "Geographical Teacher, Summer, 1921, will appreciate these more detailed expositions. The remaining article which opens Vol. XIII is on "Geography as Human Ecology" (Barrows, 14 pp). This, in a most attractive manner, asks us to cry "Halt!" and then undertake a serious analysis as to the content of modern geography. We are asked to discard many items now included and develop intensively the small residuum. Whether the reader agrees with the writer's conclusions or not, they certainly merit very careful consideration. W.E.W.

The Road Books and Itineraries of Great Britain: 1570 to 1850. By Sir Herbert G. Fordham. pp. xvi + 72, 22½ x 17½ cm. University of Cambridge Press. 7/6.

This is largely a re-issue of the author's 1916 catalogue, but Ireland (1647-1850) has been made the subject of a separate catalogue published in Dublin in 1923, and the material for Great Britain has been supplemented to such an extent that the writer tells us that "this edition should be regarded as the definitive one, and it seems improbable that anything additional . .. . can now remain undiscovered." Fordham's name is a guarantee as to the character of the catalogue, and we welcome the introduction, which sets out so clearly and so fairly the reasons for the inclusion or the omission of certain kinds of material. This introduction is a scholarly essay on the British road book, and the remarks with regard to guide books and modern railway time tables (p. vi) are of general interest. The present volume seems to be intended for the specialist reader, in fact, the market issue of this edition is but 500, numbered, copies. but it deserves to reach a wider circle. The test of a catalogue is the accessibility of the references. The material is chronologically arranged, with an index of authors and publishers. One hesitates to suggest any alteration to a bibliographer of the eminence of Sir George Fordham, but there are apparently 24 Scottish examples and about 20 for Wales, with smaller numbers for other regions, and some readers would appreciate a separate index for the chief of these. The catalogue ends with 1850, but the road-book spirit lives on, and the 20th century rejuvenesence is important. There is a hint that certain modern guide books approach the form of the old road-books, and perhaps it may be permissible to instance Muirhead's Blue Guides in this connection. Certain of our great modern railway groups also appreciate that a large number of travellers are interested in something more than the termini, and Mogg has a modern anonymous successor, who has interested the reviewer, at least, in connection with the G.W.R. "road."

W.E.W.

World Weather. By H. H. Clayton. pp. xx + 393 (nearly 300 illustrations), 22½ x 15 cm. Macmillan. 18/-.

It is impossible within the course of a short notice to call attention to the many good features of this book. Mr. Clayton has collected together a great mass of data with a fine appreciation of the relative values of the different items. It is extremely difficult to suggest any important paper on weather science written or issued during the present century, which has not had its material facts fitted into this very logical compilation. All aspects of world weather are included, and in addition there are chapters on solar radiation and on the meteorology of the sun. Appendices describe the modern method of handling statistics, and both the method of correlation and harmonic analysis are described so carefully that the general reader can follow them without difficulty. The book, though produced in America and evidently owing much to several American meteorologists, will be equally valuable for British people, and it is likely to rank as the standard reference volume in English, particularly for the non-mathematical reader.
W.E.W.

An Introduction to Oceanography. By James Johnstone (Professor of Oceanography, University of Liverpool). pp. xii + 351, 22½ x 14½ cm. Hodder and Stoughton for University of Liverpool. 15/-.

Notwithstanding the numerous British contributions to the science of Oceanography, the number of books on the subject written in English is extremely small, and the present volume is very opportune. An important feature of the work is that it has been written with special reference to the requirements of students of Geography and Geophysics; in consequence, the biological and part of the dynamical sides of the subject are either omitted or scantily treated. Even then, this large volume bears the impress of drastic compression in several of its sections, e.g., the tetrahedral earth hypothesis is disposed of in about a page, and the hypothesis of spherical harmonic deformation gets little more space, but Dr. Johnstone, rounds off his volume with a detailed chapter on the literature consulted, so that readers can proceed further with any topic in which they are interested. Perhaps the chapter which gives marked individuality to the volume is that, Chapter VII, dealing with tides, and, as might be expected, the Tidal Institute of the University of Liverpool has been placed under heavy and valuable contribution, and these fifty or so pages are of themselves important enough to justify the issue of this book, but there are also other striking chapters. Geologists, particularly, will appreciate Chapter X, " Secular Charges in the Ocean." Those geographers desirous of obtaining a useful, accurate, and non-technical approach to geophysics will find it in Chapters II and V, " The Origins of the Ocean " and the " Oceanic Margins," in addition to the chapter on " Tides " mentioned earlier. The sketches illustrating the text are in most cases new, and are all excellently executed, though the book does not pretend to be self-contained in this respect, and the advanced student will need to refer to various charts and atlases for a full development of the subject. W.E.W.

In Quest of El Dorado. Stephen Graham. 22½ x 14½ cm, 346 pp. Macmillan, 1924. 12/-.

This book suffers from the lack of any map or photograph or illustration of any sort, and also has no index. The author set out to follow Columbus from Spain to America. He visited Madrid, the Indies, New Mexico, Panama, Quivira, and Mexico, and gives a cameo impression of what struck him most in these places. Here and there, as in his descriptions of the Santa Fe districts and of the descent to the Grand Canyon, we get real pictures of the country, e.g., " At three thousand feet below, all the cold airs are gone; there are green leaves on the tree .. . . But we come out on an exposed plateau, above the madly-rushing Colorado R., but below the main masses of the ravine. Between wall and wall of the Canyon rise gigantic isolated rocks, as if there were a city built in the trough of the river . . . The plateau is boulder-strewn and only enlivened by the iris-like yucca stems and by small pink cactus and prickly pear . . . . On our left is an appalling great red fortress of stone, whose sheer wall cuts across the life light of the zenith; on our right and below us is the rock-cleavage of the hidden Colorado R." Unfortunately for the geographer these descriptions are much too rare, and a good deal of the book is concerned with the author's reflections on politics and the social order.

Local Geology. A Guide to Sources of Information. A. Morley Davies. 16 pp., 21.5 x 14 cm. London: Murby, 1923. 1/-.

The name of the author and the sub-title are both indications of the great value of this little pamphlet, which we hope will spread widely among those who wish to start studies of their own regions.

Roman Britain. R. G. Collingwood. 104 pp. + end-maps and numerous illustrations. London: Oxford Univ. Press (H. Milford), 1923. 2/6 net.

A useful and attractively written little book emphasising the composite elements, Roman and Celtic, that in the writer's opinion fused over a U-shaped area (from Shrewsbury to Dorset, thence via Kent northward to Lincoln) to make Romano-British life. The author gives interesting fragments of evidence for his view from design and decorative work. He points out that probably the Britons were aglow with pride in the Roman Empire, and that men who had learned to make and use hypocausts and Samian ware would not like to be classed with the wild men from beyond. It is useful to put this point of view, though one may doubt its completeness. The author hardly touches upon the problems of the relations of Romans with Wales, and other matters of "Roman and Native" import are also lightly handled. The question as to Roman survivals through later ages is just touched upon, and the author inclines to the negative view. The little book is of considerable value, but does not suggest the themes of the larger book we need dealing with Roman Britain from the basis of a knowledge of general British archæology as well as of Roman studies.

Shackleton's Last Voyage. The Story of the Quest. Frank Wild. 24 x 16 cm. 372 pp. Illustrations and maps. Cassell, 1923. 30/-.

This is yet another of the valuable books giving the story of heroic attempts to add to our knowledge of the Antarctic regions. It is exceptionally suitable for the shelves of the school library, partly because of its delightful illustrations and partly because of the author's way of setting down everything that chanced to interest him in the day's happenings. Philosophy, a quotation from Browning, a description of Gritviken, an account of the welcome the ship's dog gave to the ship's pig, the preservation of oaten cakes for eleven years, the story of the stowaway "Micky," all crowded on to a couple of pages, may strike a grown up reader as a quaint mixture, but the ordinary youth and maiden revel in exactly such details, which tend to make it easier for them to visualise their hero's daily life. For those more interested in the scientific aspect of the expeditions there are five appendices giving the results of observations in geology, natural history, meteorology, hydrographic work and medicine. It would have added much to the value of these appendices if others besides Dr. Macklin had added a bibliography for those wishing to pursue their studies more deeply. There is a good index. Those schools which have scout troops will be much interested in the story of the scout, Marr, who accompanied the expedition, and proved himself peculiarly fitted for a life of hardship. The detailed account of the Tristan de Cunha group and its curious isolated community is specially useful.

Racial History of Man. R. B. Dixon. London: Scribners. xvi + 583 pp., 23 x 51 cm., 44 plates. 1923. 25/-.

The subject of races and race characters is admittedly a difficult one, for it is a feature of all human races that they can interbreed, and thanks to the discoveries of Mendel, we now know that individual characters are often inherited from one parent or from the other, i.e., that for each character the child inherits from one parent rather than that it receives a mixed or averaged inheritance from the two. Thus some features of head form may be derived from one parent and other features from the other. It is thus evident that we should get more profit from a geographic study of individual characters than from a continuance of the old attempts to distinguish racial stocks absolutely and to invent a classification of such stocks, though such classications have a broad value. Moreover, if we indulge in the idea of distinctness of racial stocks unduly, we imagine too easily that these stocks have been distinct from time immemorial, and so run into grave error. In his refreshingly heterodox book, Prof. Dixon shows himself awake to some of these difficulties. His method has been to select three characters, namely, the Cephalic Index (Breadth/Length), the Index of Head Height (Length/Height), and the Nasal Index (Breadth/Length), and to make a list of the possible combinations of the more pronounced (high or low) values for these indices. Then he has surveyed the known data for the various peoples of the world, and has sorted them out according to these data. He has thus ascertained geographic distributions of population groups, in each group of which many individuals have these three important characters much alike, the various groups also being alike in the same way. The results are very interesting, and give much food for thought, though one regrets that the author has given geographic names to his assorted groups; it is confusing to give the name "Mediterranean" to Californian stocks. The book is full of interesting reflections, its maps are valuable and its photographs numerous. The student might at the same time study the article by Thomson, A., and Buxton, L. H. D., in the Journal of the Royal Anthropological Institute, 1923, on the distribution of nasal characters. Both studies are, however, strictly tentative, and the whole subject clamours for serious attention from geographers.

China Yesterday and To-day. E. T. Williams. 613 pp, 21 x 13½ cm, map in pocket, photographs. George G. Harrap and Co., 1923. 15/-.

An important and influential section of American public opinion is keenly interested in Far Eastern problems. Its activities in the Chinese educational field are well known, and complementary to these has been the appearance during the last few years of a considerable number of serious academic studies aiming at the interpretation of China to the Western World. Among them may be noted Dr. Paul Reinsch's "Intellectual and Political Tendencies in the Far East," Bishop Bashford's "China: An Interpretation," Ross' "The Changing Chinese," Professor King's "Farmers of Forty Centuries," and, more journalistic in character, the detailed political studies of Mr. Millard, the Editor of "The Weekly Review of the Far East."

The present volume certainly ranks in importance with the best of these works. Its author, Professor E. T. Williams, now in charge of the School of Oriental Languages and Literature in the University of California, was formerly American "Chargé d'Affaires" at Peking and subsequently Chief of the Division of Far Eastern Affairs, Department of State. It is characteristic of America's attitude to China that her academic authorities on the Far East are frequently given important diplomatic positions there, as in the case of Dr. Reinsch, who was made America's chief representative at the Chinese Capital at a very critical juncture, and conversely, as in the case of Professor Williams, that her diplomats, on retirement, often occupy important chairs in the American Universities.

In this volume Professor Williams gives us the fruit of his long experience and detailed observations of China, and the result is a very comprehensive, careful, and well-proportioned survey. The book has certain conspicuous merits. It is pre-eminently fair and dispassionate. The author has no axe to grind and no particular thesis to maintain. He has great sympathy with the Chinese, and has been a careful and understanding student of their customs, institutions, and social philosophy, but he is not afraid to criticise, and his criticisms are often suggestive and constructive. The tendency to appraise moral and social values by American standards is occasionally apparent, but, as a rule, is restrained. The author manages to work in a large amount of interesting detail and copious illustrations without blurring the main outlines of the pictures which he wishes us to see and the generalisations which he wants us to remember. The detailed descriptions of the family life of the Chinese, of their festivals and observances, and, more particularly, of Confucianism as a State religion, and its significance, are extraordinarily graphic and impressive. The style throughout is lucid, and the argument of each chapter and section well-sustained. The book would, however, have gained in value if the attempt had been made towards the end to relate the different aspects of Chinese civilization which have been separately delineated, and so to present the problem of reconstruction as a whole made up of connected parts.

The student of geography, as such, may at first be disappointed, for the book on the geographical side is distinctly weak. The first chapter—on "What is China?"—is one of the least satisfactory in the whole work, although it contains some valuable information about the present political status of the Old Dependencies of China. This, however, is followed by a very useful discussion on "The Beginnings of China" and the origins of the Chinese people, a subject to which Dr. Williams has given special attention. His general conclusion on a much debated theme is that "the Chinese, as we know them to-day, are a mixture of a number of tribes, for the most part related, whose earliest seats were in that region of Central Asia where man first became a civilized being," and he is inclined to believe in a racial affinity and community of origin between the Sumerians and the early Chinese.

Chapters III to XV inclusive—roughly half the book—are occupied by the detailed and illuminating survey of the essential elements of Chinese culture (social, economic, and religious) to which reference has already been made. The author, it should be noticed, repudiates the view that "Confucianism is not a religion but a system of ethics," and demonstrates the almost inseparable association of the social philosophy of the Chinese with their religious conceptions.

The last portion of the book deals with the evolution of the foreign relations of China, the political crises of recent years, the attempted re-construction from the time of the Boxer Rising, the problems of the Republic, and "The Struggle for Democracy." Professor Williams does not minimise the gravity of the present political chaos, but he is by no means pessimistic about the future of China, and holds to the view that the essentially democratic constitution of Chinese society can be maintained and gradually adapted to modern conditions. He does not, however, sufficiently emphasise the menace to the stability of the social structure of the introduction of Western industrialism. Readers of this survey would do well to supplement it on this important side by referring to Dr. Hodgkins' book on "China in the Family of Nations," already reviewed in this magazine, and to Professor J. B. Taylor's important article on Labour Conditions in

China in a recent number of "The International Labour Review" (Labour Bureau, The League of Nations).

One chapter is devoted to the problem of Oriental Immigration into America, and it is instructive to note the author's opinion that while Orientals already legally residing in the United States should be naturalized and absorbed, all Oriental (Japanese as well as Chinese) labour immigration should be forbidden in the future "for the protection of our own (American) people." The last chapter of the book is a useful survey of the Foreign Trade of China and of the mechanism by which it is carried on.

The map, contained in a pocket on the outer cover of the book, is mainly valuable for its demarcation of the new territorial divisions of the Dependencies, particularly Tibet.

P. M. Roxby.

Medical Research Council, Special Report Series, No. 52. London, 1920. H.M. Stationery Office. 295 pp. 6/-.

This report on the science of ventilation and open air treatment seems hardly within the geographical field, and its first section is a stiff account of radiation, but the author Dr. Leonard Hill, F.R.S., makes this the basis for most suggestive studies in the relation of man to his environment. He goes deep into the question of skin pigment in relation to the sun's heat, light, and chemical influence, and gives interesting criticisms of the views of Woodruff and others. He has specially valuable notes on the level of human metabolism in different regions, and his study suggests a good many improvements in the approach to racial research and to geographic study. If we are, as we profess to be, concerned with the relation between man and environment, then such work as that of Dr. Hill is at the very centre of our subject, for it discusses the relations of the different organisms of the various human races to their respective environments. Hill reaches the conclusion that with careful sanitation and careful avoidance of the undue screening of the body, our stock could gradually acclimatise itself even to Northern Australia provided it is kept from dependence on coloured labour. He thinks the protected life of the white women who go to warm lands is largely responsible for the difficulty in acclimatising the race; they should get their whole bodies sun-tanned, though he sees that this would mean acclimatisation at the price of a considerable change of physical character as well as of social convention.

The Naturalist in Manchuria. Vol. 1. A de Carle Sowerby. 26½ x 18½ cm. 347 pp. (small print) + folder map. Tientsin Press. 25/-.

This volume, which is the result of several years' work both in the field and in the study, gives an account of a series of biological and geographical explorations carried out by the author on behalf of the Smithsonian Institution. The scientific world owes much to the efforts of the Smithsonian Institution, and geographers will be specially grateful for this serious and comprehensive study of Manchuria, a region which though little known and studied to-day, will inevitably take an increasing part in world affairs. This first volume is devoted to descriptions of journeys through the country, of the country itself, and of the fauna of regions hitherto unrecorded in the scientific annals of biology. There are four further volumes dealing with the animals themselves and the problems connected with them, but these four will appeal to students of natural history more than to geographers. The present volume, however, has the first importance for geographers, and should be secured for all geographical libraries. There are many very beautiful photographs, and some delicately coloured paintings by the author, specially mounted, of which Sunset on the Yalu River and the Siberian Slipper Orchid are particularly worthy of mention. It is unfortunate that the folder map does not show relief, and we hope this will be remedied in future editions. It would be an impertinence to write anything in the nature of the ordinary review about a work of which few save the author can have so much knowledge, even from the "study" point of view, quite apart from his experience in the country itself. For it is evident that the author has read as widely as he has travelled, and he gives a full bibliography of the sources of study available. It is sufficient to indicate that there are chapters describing the South Manchurian Coast, the Ching Valley, the Frog Valley, the Crater Lakes, the Sungari R., the Yalu R., and others on the primeval forest, the denizens of the woods, woodcraft, and so on. Of special interest to a certain section of our readers will be the chapter on the Fish Skin Tartars and other people of the Manchurian Region. The author considers that there is clear proof that the Yenisei Ostiaks, the Abacan Katchinci, and related groups, as well as the Selenga Buriats, the Eastern Mongolians, the Tibetans, the East Siberian Oroczi, and the Saghalin Gilyaks, show the persistence of an older race than the Mongols and Chinese, and that it was from this older race or stock that the off-shoot, so-called Mongolo-American sprang. The resemblance is not only physical but also cultural. Those interested should look up Dr. Hrdlicka, "Remains in Eastern Asia of the Race that peopled America," Smith Misc. Coll., Vol. 60, No. 16. The chapter also discusses probable links with the "Cro-Magnon" race (if that race ever really existed!) and gives a sheet of diagrams based on Sollas "Ancient Hunters" and Schrenck "Reisen und Forschungen im Amur Lande."

In Brightest Africa. Carl E. Akeley. 23½ x 15½ cm, 267 pp. William Heinemann, Ltd., 1924. 21/-.

This very finely illustrated book should find a place on the shelves of all school libraries, for it gives in an interesting and original way descriptions of scenery and wild life in the regions of Africa lying around Lakes Tanganyika and Victoria Nyanza. Mr. Akeley went to observe wild life there in order to get data for his studies of African animal life for the Roosevelt and African Halls in the American Museum of Natural History. He has realised how rapidly the "Royal Families of the Age of Mammals," as Dr. H. Fairfield Osborn terms them in his introduction, are dying out, and has endeavoured by taxidermy, bronzes, photographs, and paintings, to place on record this life before it fades altogether. His suggestion that the region round Mts. Mikeno, Karisimbi, and Visoke should be kept as a sanctuary for gorillas, elephants, buffaloes, and other wild life of that district, is very valuable. The results of such provision for wild life sanctuaries in North America at Banff and at Yellowstone Park, are so encouraging that it is to be hoped steps will be taken to ensure the same care for African natural life before it is too late.

Anatolian Studies. Presented to Sir W. M. Ramsay. pp xxxviii + 479, 26 x 18.5 cm, 14 plates, including frontispiece portrait. Manchester University Press. 35/-.

The custom of offering a collection of studies as a tribute to a veteran scholar is one which is heartily to be welcomed, and this Association may specially welcome a collection which is an homage to its distinguished ex-President. An additional reason for welcoming this volume is that it contains contributions from scholars in England, Scotland, France, Belgium, Italy, Germany, Austria, and the United States of America, a valuable indication that intellectual co-operation is beginning to recover from the fever of nationalist prejudices.

A discussion of the date of Strabo's Geography (J. G. C. Anderson) shows that Strabo probably wrote in some provincial city of the eastern Mediterranean, where he was out of touch with current events to some extent, and not at either Amascia or at Rome. His knowledge of eastern affairs was becoming meagre about 6 or 5 B.C., but it extended on to 3 or 2 B.C. A good many years afterwards, perhaps about A.D. 18 or 19, the author gave the work a superficial revision.

The old languages of Asia Minor are a field where knowledge has much advanced, not a little owing to Ramsay's keenness and freshness of view. A survey (A. H. Sayce) tells us the newest view of Hittite as a language coloured by Indo-European borrowings almost as largely as English has been coloured by Latin. The old languages of Asia Minor, in fact, show so much influence of Indo-European, that Sayce and others seem inclined to look to Asia Minor or some region near it as the first home of that family of languages rather than to Central Asia or to Europe, as has been the fashion. They are, at any rate, strongly inclined to think that the ancestors of the Sanskrit-speaking tribes of N.W. India were living in the 15th century B.C., on the plateau of Asia Minor as breeders and trainers of horses.

A discussion of Lydian (Fraser) tells of the discovery of the Tocharian (Indo-European) language, most nearly related to the Italo-Celtic group, in Central Asia, and points out that this surprising new fact makes new revisions necessary. Lydian is claimed to be a language of the Caucasian group modified by Indo-European contacts and related to Etruscan. Sayce would apparently rather dissent from the last opinion. Keil shows how, in religion, aboriginal Anatolian features persisted in spite of all invasions, a famous thesis of Ramsay's.

Economists will be much interested in an account of Labour Disputes in ancient Asia Minor. Hall has important suggestions about the coming of iron in its relation to the Hittites and Egypt. The Hittites controlled the supply of iron to lands south of their territory, and probably went down before better armed iron-users like the Myscans and Phrygians, whom Hall considers as a new "Indo-European" element in Asia Minor. Mycenean Greece and Troy also went down; Egypt escaped, thanks to her isolation from the north. Hogarth works out the complexity of the "Hittite" people. Their monuments are found in N.W. Cappadocia, in S. Cappadocia and S. Lycaonia, in N. Syria and on the N.W. fringe of Mesopotamia, and in three places along the line from N.W. Cappadocia to the Ægean Sea. Olmstead shows that while the Babylonians influenced Cappadocia about 2400 B.C., and the Hittites did the same in the second millenium B.C., the Assyrians were of great importance there between 1000 and 500 B.C.

We may conclude with a summary of a paragraph contributed by Deissmann, who says that many problems are merely results of pondering over texts under the midnight lamp in the study, and the matter becomes clear if we do what Ramsay has so conspicuously done, namely, carry our problems back to their original homes and study them with the help of its sunshine and its hills and valleys, a fine apologia for the work of one of the greatest of geographers.

The Great White South. Herbert G. Ponting. 305 pp., 22 x 14 cm. Duckworth. 7/6. Sixth impression.

This finely written and beautifully illustrated record well deserves the appreciation it has received in the past. It is to be hoped that every teacher of geography will see that the book is added to the school library, if it has not yet found a place there.

Junior Regional Geographies. Book III. The Regions of the World. By W. H. Barker and Leonard Brooks. pp. 272, 19x12½ cm. University of London Press. 2/9.

This, the third and concluding book of the series, satisfactorily rounds off a carefully prepared scheme. The earlier books have been favourably reviewed in these columns, and the present volume is even more successful. A junior class working steadily through this material, with or without the aid of a teacher, should obtain more than a nodding acquaintance with the important facts of general world geography, and should be well equipped to proceed to higher and more detailed work. The regions are carefully chosen, and, as is to be expected from such experts in the teaching of the subject, the treatment is logical, well illustrated, and tested at intervals by suitable exercises, though a few of them, rightly so, no doubt, need additional material for their completion. Teachers will welcome the care with which the facts have been collected, the inclusion of so much up-to-date material, e.g., Stefansson's Arctic work, and the pointed comments and queries appended to many of the illustrations. W.E.W.

The Banyankole. Canon Roscoe. 176 pp., folder map, 23 x 14 cm. Camb. Univ. Press, 1923. 15/-.

A great amount of condensed information has its value enhanced by collection direct from natives. The "Cow People," the ruling caste of the country, are, of course, fully treated, while the agricultural serfs or peasantry are also dealt with. In some paragraphs it is not always quite clear which of these two diversions of the population is under discussion. The number of taboos associated with milk are of great interest, and the whole cult reminds one of the importance of cattle and milk among the Todas, although the Banyankole do not seem to have developed a diet therewith in any way comparable to that found among the Todas. A comparative study of the two cycles of belief or practice might be useful. The section on religion seems hardly full enough; comparison with the Southern Bantu would be useful, but the material for the Banyankole here given is hardly sufficient. Early kings were deified, and each of the gods had his special fetish, an interesting point. The nearest parallel in the south is, perhaps, the "mhaniba" of the Tenibe and Zihlahla clans of the Ba Ronga, compare Junod, "Life of a South African Tribe," II, 373. I know of no other fetish of this kind in the Southern Bantu area. The specific names for colours of cattle can be fully paralleled in Se Sotho, which has, it is said, at least 200 such names. With the importance of the numbers 6, 12, and 14 in divination, the taboo on the number 7 among the Transvaal Ba Sotho and Baledi in counting cattle, and on the use of the 7th (index) fingers in counting or indicating number, may be compared. The whole cycle of sexual taboos is important, and may be partially paralleled among the Ba Ronga in the south, especially in connection with hippopotamus hunting. It is interesting to note that the hair of the Bahuma "was not in tightly curled tufts like that of the negroes, but it was always wavy and never straight." H.L.B.

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The Archæology of the Cambridge Region: A Topographical Study of the Bronze, Early Iron, Roman, and Anglo-Saxon Ages. With an Introductory Note on the Neolithic Age. By Cyril Fox, Ph.D., F.S.A. pp. xix, 360. Cambridge, at the University Press. 1923.

For some little time the study of the distribution of archæological finds has been gaining increased recognition as a method likely to yield fruitful results by revealing lines of movement in culture of intercourse between peoples and areas, and to some extent of migrations of races. Dr. Fox's study of the archæology of the Cambridge area, in its employment of the method of plotting distribution exhaustively within a limited area and reconstructing its cultural history by an interpretation of the result, is in a sense an epoch marking achievement. He has, to use a colloquialism, "squeezed the orange dry," and in so doing set a standard which is not likely to be superseded for some time to come.

The area with which he deals is a square of which the sides are forty miles long and of which Cambridge is the centre. It includes portions of Norfolk, Suffolk, Essex, Hertfordshire, Bedford, and Huntingdonshire. Four distinct types of country are found within the district. (1) Fenland in the north; (2) east and south of the Fens a continuous belt of dry chalk down-land, stretching from the south-west to the Kennett in the east; (3) from the Kennett to the northern boundary, the East Anglian heath country, with light, well-drained soil; (4) south of the open country, oak-ash forest with a sub-soil of boulder clay. There is reason to conclude that the forest area was at one time more extensive than it is to-day. It is clear that the dominant factors in the pre-history and early history of the country must have been the ready means of access by water and land allowed by the fens and the open down and heath on the north side, and the effective barrier of the forest on the south-east and north-west. Another factor of importance was the crest line of the chalk belt which crosses Cambridgeshire diagonally, along which the Icknield way ran, but below the summit. It was along this track that the trade routes came from south and west, and influenced the culture of the area by contact as distinct from invasion.

The effect of these geographical factors on the history of human occupation in the Cambridge area, as demonstrated by Dr. Fox's inductive methods, are very much, on broad lines, what might have been expected from a general examination of the geographical conditions. The distribution of finds indicates an early occupation of sites adjacent to abundant water supply on heathy warrens in early neolithic times, these sites becoming more sparsely populated as the growth of agriculture is accompanied by a withdrawal from the open land suitable for pasturage to the fertile corn lands of the valleys of the Little Ouse and Lark, the eastern border of the Fens, and the Upper Cam and Ivel Valleys in the Bronze and Iron Ages. The area of secondary settlement in the forested belt is under effective occupation in two periods only within the survey in Roman times and in the Anglo-Saxon period in its later phase. It was in these two periods only that the requisite standard of civilization and of settled social conditions were attained. In the intervening periods of conquest and invasion, occupation shrinks to the areas of primary settlement. The cultural character of the area tends to be uniform, and links on to culture of the east coastal district extending as far north as Yorkshire. Continental influence penetrated through the entry of the Wash, the sole exception being the Roman, which came from the south.

This brief summary of the main conclusions does less than justice to Dr. Fox's work. He handles a mass of detail in masterly fashion. There is no class of evidence from which he fails to draw its story, usually in a form in which, while it supports his immediate argument within the scope of his study, is of no inconsiderable value in its applicability to the problems of other areas and of this island as a whole. E.N.F.

Life in Southern Nigeria. The Magic, Beliefs, and Customs of the Ibibio Tribe. By P. Amaury Talbot. London: Macmillan & Co. 1923. pp. xvi, 356. Price 21/- net.

Mr. Talbot has earned the thanks of all students of the customs and beliefs of primitive races for the use he has made of the opportunities afforded by a term of office as Resident among the Ibibio, which lasted for ten months only. The amount of information he has been able to collect in this comparatively short time, notwithstanding heavy official duties, is remarkable. His work gains added value from the fact that he was assisted by Chief Daniel Henshaw, to give him his English name, Native Political Agent for the District, who both furnished data which might not otherwise have been obtained, and corroborated the information of others. It may be mentioned in passing that in several of the recently published ethnographical books dealing with African peoples, the information has been checked, or in part furnished, by native officials. It is unnecessary to emphasise the value of information obtained in this way under due precaution.

Mr. Talbot's book was completed in 1914, but its publication has been delayed owing to the war. The date is of some importance. As is well known, the effect of that world-wide catastrophe on the native populations of Africa has been considerable, especially as regards mental outlook; and as those who are acquainted with Mr. Talbot's previous work will hardly need to be told, his main interest lies in the psychology and underlying philosophy of native belief. The greater part of his book is devoted to this side of Ibibio life—jujus, magic, secret societies, the beliefs connected with the soul, ghosts, dreams, death, and the like. In the beliefs connected with the soul and with animal affinities to which the soul may be transferred at will or in which it may be materialised, Mr. Talbot finds much which recalls the Egyptian creed. Like other writers on West African religions, he holds that these beliefs "contain a greater element of spirituality than has usually been credited to them." Notwithstanding that much which, to us, is gross and revolting, is inherent both in belief and ritual, there is undoubtedly a great deal to be said for this view. If, however, as has been suggested, we are to look to Egypt for the explanation of this spiritual element, it is difficult to see why it should not occur in other parts of Africa where it might then be expected. One very interesting matter, of which Mr. Talbot was able to obtain only a faint tradition, was the appointment annually of a Chief as a priest who slew his predecessor, and was himself slain at the end of the year by his successor.

It has been possible to touch upon one or two of the almost innumerable matters of interest and importance with which this book deals. The reader will find that Mr. Talbot's modest claim to have provided material for the labours of "authors gold-penned, and writing in the restful atmosphere of panelled libraries," by no means expresses the true value of his contribution to anthropological science. E.N.F.

Economic Geography of the British Empire. C. B. Thurston. 384 pp., 19½ x 12½ cm. University of London Press, 1924. 4th edition. 5/-.

The fact that a new impression of the fourth edition of Mr. Thurston's book has already been called for shows that it is filling a real need, and teachers should find it specially useful this year, when so much attention is being given to the geography of the British Empire.

Indian Days in the Canadian Rockies. By Marius Barbeau. Illustrations by W. Langdon Kihn. Toronto: The Macmillan Co. of Canada. 1923. pp. 203.

Imaginative reconstructions of primitive life are numerous, but it is seldom that their authors have the knowledge and intuition which are essential if they are to be of any real value to those whose opportunities for more formal study of ethnographical data are limited. Mr. Barbeau's book can be recommended cordially to such readers. It is, in part at least, a reconstruction based upon Indian tradition and records, and written from the Indian point of view, of the life of the Indians of the Canadian Rockies and the adjacent plains immediately before and after the coming of the white man. The story of Beeny the Sorcerer, a description, perhaps a little idealised, of the mentality of a medicine man with an honest belief in his own powers, and of the attitude of his tribe toward him, is something of a *tour de force.* It would be difficult to give, even by quotation, any adequate idea of the author's success in conveying the impression of the half-incredulous awe with which the Indians received the prophetic intimations of the coming of the white man. Civilization brought in its train many evils, of which small pox was one. Here again Mr. Barbeau is able to give us the story from the Indian point of view.

The Indian tribes dwelling about the Rockies with whom Mr. Barbeau is concerned are the Stonies (Assiniboine), Kootenay, Blackfoot, Salish, and four nations of the Athapascan stock. The Stonies, who belong to the Dakota branch of the Siouan stock, coming originally from the headwaters of the Mississippi by way of the country between Lake Superior and Hudson Bay, settled near Lake Winnipeg; their wandering bands roamed over Manitoba and the southern part of Assiniboia and Alberta. Hence they were driven on to the mountains by the Blackfoot, who were among the first to get fire-arms from the white. Their history, and in particular the story of their feuds with the Blackfoot, which Mr. Barbeau gives in some detail, is an instructive study of the forces at play in primitive economics. Dwelling in reservations, as they now do, these Indians have become utterly sophisticated. Their religious and tribal organisation is entirely disintegrated, much to their detriment. Yet their mental outlook remains unchanged in many things, as was shown by the difficulties encountered by the artist who produced the remarkable portraits of the Indians in their traditional ceremonial dress, with which the book is illustrated. When the Indians saw these portraits they were shocked by their vivid accuracy, for they feared that they might prove dreadful magic. E.N.F.

The Lakes of Northern Italy. Richard Bagot. 19½ x 13 cm. pp x + 239, 37 illustrations, map. Methuen. 8/6.

This guide book specialises on the historic side, and affords a serviceable hand-book to the tourist to the Lakes of Northern Italy. It tells graphically, but concisely, the chief facts of interest connected with the Lake Towns in Roman times, as well as many stirring incidents related to the struggle between the great Italian Houses, the Visconti, the Scaligers, etc., during the Middle Ages. Incidentally, the relation of the Lakes to the Alpine passes and to the tributary valleys of the Po Basin comes out very forcibly.

Information is given regarding the soil and vegetation and the chief facts arising from these; there is also much that is interesting concerning monuments, pictures, etc.

A great asset to the book is the large number of good photographs which illustrate well the charm of mountain and lake. Particularly interesting are those of the less frequented lakes of Iseo and Garda, which show the distribution of the olive in the rich lands of Eastern Lombardy. S.H.

Casual Wanderings in Ecuador. Blair Niles. 21½ x 14 cm. 247 pp. John Long, 1923. 12/6.

If the book had no other claim, the delightful photographic illustrations would tempt one to buy it. The " Water Jar of the Rainless Season," " The House of the Potter," the " Main Street in Banos," to name only three, where all are good, give vivid pictures of the life of this little known region. There is, however, much else that is of value in the book, and the author's way of recording the result on humanity of the physical geography of the region, though not in any sense scientific, is yet most useful to those who want to get facts about Ecuador and the life of its peoples. The gossipy and discursive style may not attract every reader, and may sometimes make one long for more information and less conversation. But on the other hand, the record is well written, and there are few scholars in upper forms who would not thoroughly appreciate it and widen their vision of Ecuador. It should form a valuable addition to the school geographical library.

The Resources of The Empire. Vol. X. Communications. W. Tetley Stephenson. 26 x 19 cm. 180 pp. Ernest Benn and Co., 1924. 21/-.

This, the concluding volume of a series prepared for " business men " by the Federation of British Industries, should prove of considerable value to students and teachers of economic geography.

A quarter of the book is devoted to Shipping and related matters, many only of technical interest. The chapter on Sea Routes of the Empire is a very illuminating one; the careful study of the many geographical factors causing the Cape Route to be the principal cargo route to Australia while it takes second place to the Suez Route on homeward voyages being very valuable. The seaports of the Empire are considered in detail with reference to the possibilities of their harbours being deepened to accommodate the larger ships which economy and speed in modern commerce demand, and to their facilities for bunkering ships with coal and oil fuel and for dealing with cargo. It is noted that more than a third of the world's shipping now under construction is to use oil fuel.

The Railways of Great Britain, India and the Dominions are next considered, but from a technical and commercial rather than a geographical standpoint. Each chapter has a clear map, which, however, conveys rather less information than is to be found in most good modern school books. A plea is made for a more enterprising government policy in the extension of Indian Railways, and for the further development of the elevator system in dealing with the maize crop of South Africa and the wheat crop of Australia. In Canada, on the contrary, railway development seems to be ahead of demand; and the suggestion is made that in Great Britain trade might benefit from a railway service of less high standard and frequency combined with lower rates and charges.

The chapter on Roads and Road Vehicles points out the need for enlightened public control of recent developments in these means of transport, and suggests other factors than tariffs as being of importance for the extension of the home motor car industry. A careful consideration of Inland Waterways leads to the rather surprising conclusion that no canal within the Empire (or outside it) is a really sound commercial investment.

The value of Air Transport and " Wireless " to Imperial Communications is appreciated, but it is suggested that for some time their greatest usefulness will probably be in conjunction with and as an extension of the older and more fully established methods, rather than in superseding them.

The book, which has a good index but no bibliography, except casual references, may well be worth a guinea to members of the Federation of British Industries; but teachers, who must perforce practice the economy which distinguished members of that federation preach so eloquently, will probably find the price prohibitive. The library copy, however, should be in great demand. C.B.T.

A Newcomer in Canada. J. Peat Young. 19½ x 13 cm. 168 pp. Cecil Palmer, 1924. 5/-.

The author is evidently sincere in his profound belief in the advantages which Canada offers to newcomers, and it is refreshing to read such a tribute to the character and friendliness of the Canadians, whom he knows. Certainly many of his friends and acquaintances seem to have benefited enormously by their decision to settle in Canada. The book is written in a bright and interesting way, and the numerous examples of fortune's favours bestowed upon immigrants make one feel that the days of the good fairies rewarding the industrious and deserving are still with us. The intending emigrant should note, however, that no examples of fortune's refusal of these favours are given, and also that Mr. Young states very frequently that a certain amount of capital is almost a *sine qua non*, and that a peculiarly specialised temperament is an absolute essential. The book is brightly written and has nine illustrations.

The Real 'Round South America. Harman Black. 21 x 14 cm. 244 pp. + end map and notes. Simpkin Marshall, 1924. 10/6.

This book will be welcomed by teachers in search of information about South America. The author started from New York by boat, and sailed through the Panama Canal to Callao, the port of Lima, to the Talara Oil Field, and to Mollendo. He afterwards went by train to Arequipa, then proceeded to Cuzco, Lake Titicaca, Guaqui and La Paz, and after motoring across the Andes, went on to Buenos Aires, coasted up to Santos, Rio Janeiro, and then home to New York. His journey included an aeroplane trip over Rio harbour and an aerial wire trip, of which a photo is given, to the top of Sugar Loaf. It will be seen that this is a novel and interesting way of seeing South America, and there can be no doubt as to the value of the book. The descriptions of Cuzco, of the sights and scenes on the Argentine plains and of Rio Janeiro are particularly good. There are 118 pages of illustrations, some of which, e.g., those of Rio Janeiro, are specially fine. Others, e.g., those on pp. 128, 102, suffer so much from reduction that they mar rather than help the book. We wish that every serious author would follow Mr. Black's example and give a full bibliography of sources. The nine pages of classified bibliography of S. America should prove a great asset to students and teachers of geography.

The Glamour of Italy. Paul Bourget; trans. Lauretta Maitland. pp. 220, 23 x 15 cm. Elkin Matthews. 10/6.

This book is the record of " a long excursion made in the Autumn of 1890 through Tuscany, Umbria, the Marches, the region of Otranto and Calabria." Paul Bourget is treading, for the most part, on familiar ground, and from the wealth of subjects at his disposal is able to select unerringly his " pulse-beaters," as he calls them, be it the Mangia Tower, a Pinturicchio fresco, or a bit of " rugged " Tuscany or " tender " Umbrian landscape.

It is difficult to say whether we derive more delight from the matter chosen by the author or from the sheer felicity of phrasing in which he expresses it. It is largely through the medium of pictures and frescoes that he gives us the " feeling " of Italy, not only Italy of the Middle Ages, but of our own day, because the great masters " simply and naturally copied the living model," and we are aware of " the identity of the figures they drew with those we see now going about the commonest affairs of life."

Those old pictures do not surpass Paul Bourget's word-painting, and instances in support of this might be taken from every page. Perhaps for a description of a living horror the Prison by the sea at Brindisi might be cited, or, for one of tragedy, that of the Signorelli frescoes in the Capella Nuova at Orvieto, or, for mere sense of contrast, the grim mediæval walls, squares and palaces of Volterra standing out against the sky " with the clearness of a black and white etching," while at Villa Careggi, Lorenzo the Magnificent, who deluged Volterra with blood, delights in his garden " planted with evergreen cedars, with rose bushes ever in flower, with pink and white oleanders, with saffron-coloured and crimson pinks." It is as if the two symbolise the exquisite cruelty of the man, and, in reading, the hill city, typical of many another, becomes instinct with the ferocious life of the Middle Ages. The author speaks of himself as a travelling psychologist, but he is more—the book is full of his philosophy of life, viz., " acceptance and renunciation." In the " Monachorum Sepulcra " of the monastery of Monte Oliveto he seems to see epitomised that abdication of individuality and that effacement of personality which, he holds, may help his fellow men " to become better and to suffer less."

The translation of Bourget's book by Lauretta Maitland is admirable, and it is difficult to believe that we are reading a translation. It is for this very reason that it creates a great desire to read the original. Perhaps one word in the title is somewhat misleading. " Glamour " is bewitching, it is true, but it partakes of the superficial, whereas what the book really gives us is of the very essence of Italy. S.H.

— TO —

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AUTUMN, 1924.

EDITORIAL.

THE work of the Permanent Committee on Geographical Names is described fully on page 448. Standard forms of spelling would be invaluable to teachers and students, and we hope that teachers will purchase and use the lists published, and thus begin the work of standardisation.

THE Annual Meetings will be held in London on January 1st, 2nd and 3rd, in the London School of Economics, Houghton Street, Aldwych. Full details are given in the programme enclosed with this Magazine, and members are urged to make every effort to attend. A railway coupon entitling members to reduced railway rates is also enclosed in this number.

THE Spring, 1925, meetings of the Association will be held in Reading, by courteous invitation of the Reading University College. The date will be April 18—20.

THE University of Sheffield, having overcome the financial difficulties which hampered necessary expenses, has started the Geography Honours School in the Faculty of Science, and students were entered in October, 1924. The full course occupies three years after the intermediate examination, which, under certain specified conditions, can be taken at entrance to the University, but students must give evidence of a knowledge of physics to the intermediate standard, and of general geography, before they can be accepted. The following is an outline of the course:—First year: General course, with practical work, and courses in economics and modern history. Second year: Courses in regional, human and political geography; climatology; economic geography; history of geography; field work, map demonstrations, and geographical description of a selected area; subsidiary subject, geology or botany or zoology. Third year: Special courses on selected regions; oceanography; geomorphology or surveying; current problems in political geography. It is hoped to add some instruction in anthropology when the University makes provision for its teaching. Miss A. Garnett, B.A. (Hons.), University College London, has been appointed Assistant to Dr. R. N. Rudmose Brown.

IT is our pleasant duty to congratulate Mr. R. H. Kinvig, M.A., on his appointment to the newly founded Readership in Geography at Birmingham University, a note on which appeared in our last number. The new Reader's work for Geography at Liverpool and his article on the "Historical Geography of the Woollen Industry," have given him a large place in the respect of his colleagues in the subject throughout the country.

THE above two paragraphs are a sign of the increasing opportunities for geographical studies in our Universities, and as such must be welcomed by all our members. There is great need for serious geographical research in this country, and there is also great need for a supply of teachers trained on the lines of modern geographical thought. Progress in these ways can only be achieved through increasing University facilities for the subject.

THE Editor has pleasure in acknowledging a generous gift of 600 slides for our Lantern Slide Collection from Professor J. L. Myres, our President Elect for 1925. Members who have had to purchase slides in post war times will realise what a valuable acquisition this is. Professor P. M. Roxby has also given us 74 slides of scenes in China, with full notes on each slide. Miss L. G. Mercer, of Chorley, presents 60 slides of Algeria, with full teaching notes, and Mr. R. B. Emery, of the Sudan service, sends us a set of photographs of Sudanese scenes, again with full notes. It need scarcely be pointed out that photographs and notes by field workers are a great asset to geographers, who owe a deep debt of gratitude to those who so freely and generously place the results of their work at the disposal of teachers. The catalogues of the Sudan, Algerian and Chinese sets are now available, and may be obtained from the Clerk, price 3d. each, post free. The Czecho Slovakian Legation also presents to us 40 coloured slides of that country, and the Association acknowledges gratefully this international courtesy.

IT may be appropriate to mention here that, though the Lantern Slide Loan Scheme has not yet been working a full year, it has been so much appreciated that boxes of slides have gone out every week except the first three weeks in August. The collection is, however, like the library collection, still only a nucleus, and several countries are not represented at all. Efforts have been made to meet the needs of teachers asking for special books and lantern slides, and also to get slides made from negatives which were offered on loan to the Association. If this work is to continue there is need for considerable further outlay, and we venture to appeal again for financial help. As will be seen by reference to the list of gifts which made the inauguration of the scheme possible (pp. 238-9, Spring G.T., 1924), the fund for this work was provided mainly by small contributions from teacher members. The success which has attended their effort at co-operative self-help will, we hope, encourage teachers interested in the provision of further opportunities for research and for illustration of their lessons to support the scheme again. We take this opportunity of thanking the Middlesex branch for a gift of £2 just received, and the Harrogate Branch for a similar gift. It would materially help to recoup the initial outlay if members would purchase the catalogue sheets, a list of which is appended. Those sheets which give notes drawn up by prominent geographers would have a value even for the teacher who has no lantern.

LIST of Lantern Slide Catalogues.—Special Note: All these sheets have full notes on each slide, with the exception of the "Miscellaneous" sheet. (1) Switzerland, Series A, 147 slides; (2) Switzerland, Series B, 92; (3) Rumania, 60; (4) Italy, 106; (5) Norway, 95; (6) West Africa, 40; (7) Dorset and Devon (mainly geological), 43; (8) Olive and Vine Cultivation, 12; (9) Sudan, 29; (10) China, 74; (11) Algeria, 60. Miscellaneous Sheet:—Africa (Congo River and E. Coast), 34; Afghanistan and Turkestan, 31; Normandy, 30; Channel Isles, 13; England, 43; Scotland, 37.

"ACROSS Widest Africa," by A. H. Savage Landor, has been kindly presented by Mr. H. Milner to the Library. There have been numerous other additions since the catalogue was printed, and a typed list of these will be sent on receipt of a stamped envelope.

THE attention of teachers of geography in secondary schools is called to a pamphlet just published by the Welsh Department of the Board of Education, price 1s. 7d. post free, from H.M. Stationery Office, Imperial House, Kingsway, W.C.2, "The Experiment in Geography Teaching at Ruabon County School." It gives an account of the geography course as developed by Mr. E. S. Price, and includes notes on home geography, order of treatment of the continents, a detailed syllabus, equipment and correlation with other subjects.

IT is pleasant to record that a Geographical Society has now been formed in Latvia, Secretary, Mr. V. Miezis, Universitate, Kronvalda Bulv 4, Riga. There is considerable need for geographical work on this region, and we shall look forward with interest to the first bulletin of the Society.

BRANCH secretaries should note that the Educational Sub-Committee of the Anglo-Belgian Union, 35, Albemarle Street, W., is anxious to co-operate in the arrangement of lectures on Belgium.

CEYLON is to be congratulated on the honour conferred on the President of the Colombo Branch of the Geographical Association, the Very Rev. Father Le Goc. The French Government has acknowledged his distinction in educational spheres by granting him La Croix d' Officier de l' Instruction Publique.

THE report of the Conference on Meteorology in Education held at our Annual Meetings on January 3rd, 1924, is now ready, and may be obtained from Messrs Geo. Philip, 32, Fleet Street, E.C.4. Price 1. 6d. net.

MR. B. G. HARDINGHAM, 15, Enmore Road, South Norwood, S.E. 25, is organising a branch at Croydon, and will be pleased to send particulars of the interesting programme arranged for the coming season to any member who sends him a postcard.

PROFESSOR Fleure is taking a party of his Honours Students to France, leaving on March 25th and returning on April 11th, 1925. The cost will be about £21. Tickets will be taken third class, and every economy attempted. Members of the Association who would like to join the party are invited to send a stamped addressed envelope for particulars to Mr. E. G. Bowen, Dept. of Geography, 11, Marine Terrace, Aberystwyth.

A THREE-THOUSAND MILE JOURNEY UP THE NILE.

By SIR E. J. RUSSELL, D.Sc., F.R.S., Director of the Rothamsted Experimental Station, Past President of the Geographical Association.

MY wife and I last winter made a 3,000 mile journey up the Nile to Rejaf in the old Lado enclave; it is another 3,000 miles back to Alexandria, and we have in addition travelled some 2,000 miles in following the big tributaries, the Atbara or Black Nile, and the Blue Nile. The route has often been traversed and described before,* but a few notes and impressions may not be without interest to the members of the Association.

In order to realise the main features of the Nile it is necessary to understand its origin. The high lands of North-east Africa run roughly north and south, beginning with the hills near the Red Sea continuing southwards through Eritrea and Abyssinia, and on into British East Africa and Uganda. There is a gradual falling away to the north-west and then a rise towards the Congo watershed in the south and the Sahara in the north. In the great valley thus formed flows the Nile; its course is remarkably level, falling only 1,500 feet in the course of 3,000 miles. The valley is very old; it has risen and fallen in geological ages, but it never lost its general shape, and only its northerly portion became an arm of the sea. Limestone was then deposited, through which, after further lifting of the ground, the river had to carve its way. Geologically and scenically the rest of the valley is somewhat lacking in interest; the occasional rocky hills or gebels are extrusions of igneous rock; there is none of the sequence of formations that gives such variety and charm to the English landscape.

The Nile has been likened in shape to an inverted lotus; the Delta forming the roots, the river the stem, and the great lakes the flowers. One of its most striking features is its annual flood, which begins in the south in August and reaches the north in September, and continues for 10 or 12 weeks, watering much of the land and covering part of it with a deposit of silt. A further remarkable feature is its lack of tributaries for the lower 1,500 miles; not till the Atbara is reached does one see a tributary. The reason for both lies in the distribution of rain. In the south the rainfall is high but seasonal, coming in July and lasting about ten weeks, and tributaries can form in the highlands and drain off in a north-westerly direction to the river; the rain becomes less and less as one moves northwards, and from latitude 16° northwards there is a great belt which is practically rainless; no tributaries therefore can form here. Instead there is much evaporation, and even the Atbara is liable to run dry at times.

The Nile valley is conveniently divided into several regions. The chief ethnological division comes at latitude 15° or 16°, about that of Khartoum. Northwards from this there have settled from time immemorial men from the East, various Caucasian races, and later on the remarkable Hamitic race formed by the Caucasians, who moved into Southern Arabia and there fused with the negro element, acquiring dark skins, curly hair, and resistance to a hot climate. These settlers and the native population formed the ancient Egyptian race that burst out into a wonderful civilisation some 7,000 years ago and maintained a high position in the world for nearly 5,000 years. But the invasions and mingling still went on, and, indeed, they continue yet; they have been fostered by two factors: the wealth and civilisation of Egypt which drew people from all parts of the world, and slavery which brought in people from all known parts of Africa. It is not given to the three great families of mankind to blend successfully, and the indiscriminate mingling of Caucasian, Negro, and Mongol in Lower Egypt has proved no exception; for the past 4,000 years Egypt has always been governed by outside races.

This northern region of a mighty past falls into three belts. The most northerly is the Delta of comparatively recent origin, much of which was being reclaimed by the British before the war. It is extraordinarily fertile land, and is the source of practically all the cotton grown in Egypt, perhaps the most valuable commodity in the country. The soil is suitable and there is plenty of water. Three factors, however, cause some difficulty, and have had to be overcome by the cultivators and the scientific agriculturalist: the cold weather of December and January, the salt in the soil, and the rise in the water level in the soil resulting from the Barrage scheme, which gives more water and allows of more cultivation than before.

Further south comes the great central belt beginning at Cairo and extending to Assuan. This region is almost entirely rainless; life and cultivation are possible only so far as water is carried by the flood, or can be lifted or persuaded to flow from the river by human effort; everything beyond is desert. The lifting of water is possible only for a few feet above the river level, and in the main the land that can be watered forms a narrow strip on either bank of the river, the rest lying too high. In a few places the strip widens out to form fertile plains, as at Luxor, Edfu, Kom Ombo.

The line between the green cultivated land and the brown dusty desert is absolutely sharp. The higher land forms plateaux and hills, with wild romantic valleys, some of which, as at Luxor, were used as burial grounds. The total area of irrigable land is considerable, and it carries a dense population. These conditions appear to be favourable to the development of civilisation; the Babylonian, like the Egyptian civilisation, arose in a region wherever irrigation was essential and a belt of desert afforded protection against savage raiders. This is the region of historic interest and departed glories. It should have been seen some 3,000 years ago; now there are only fragments; the wonderful civilisation which flourished here has gone, completely ousted by the Greek civilisation, which to the men of those days must have appeared a very poor affair.

But the agriculture remains; the fellahin have persisted, curiously indifferent to the procession of lordly ones who have dominated them and taken toll of them. They are still, as they always have been, shovellers of earth and lifters of water. The lifting is by hand or by bullock, the implements of to-day being much the same as those depicted in the tombs of 3,000 years ago. Some of the cultivations also are the same, though the spreading of iron from the armoury to the farm caused some modification in the build of the plough, and primitive threshing tackle was long ago brought in from Asia. Wheat and flax were the great crops in the old days; wheat, sugar cane, maize and berseem are the chief crops now. A high level of production is attained, and except for the improvement of the varieties grown and the treatment of plant diseases, modern science has been able to teach the peasant very little. The native houses are square and flat-roofed, built of mud bricks dried in the sun but not usually burnt; the villages are dirty and untidy, and the only building of consequence is the mosque. Palm trees are a great feature in the landscape everywhere; the sunt (Acacia arabica) is commonly seen. Camels, donkeys, cattle with big humps and fat-tailed sheep abound.

South of Assuan comes the third great belt; owing to the contour of the land the cultivated strip along the river becomes much narrower, and the desert practically touches the Nile, so that the riverine population is very small. The men have to emigrate and become servants; they are the Berberines, not to be confused with the Berbers of North Africa or the men of the province of Berber further south on the Nile. The desert is not quite rainless; in its southern and eastern regions there is sufficient rain to permit the growth of grass and a little cultivation of the wonderful durra or millet; tribes of nomad Arabs wander about following patches of grass or durra and living on the produce of their flocks. This southern area was included in the Empire of ancient Egypt in its best days, but early split off to form the independent kingdom of Nubia, where a degenerate copy of the Egyption civilisation survived till the Arab invasion of the 8th and 10th centuries left the Arabs in sole possession.

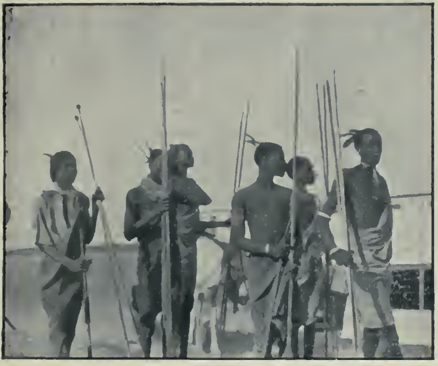
The second great division of the Nile valley lies south of 16° latitude. This was never subjected to the procession of Circassian and other invaders, but has always been left to the pigmies and the big black negroes. The pigmies have now gone, and the big black negroes remain as the sole inhabitants over most of the area. Throughout this division there is rain, which varies from 6 inches in the north to 40 inches or 50 inches in the south. The drier north belt which runs from Khartoum on the junction of the Blue and White Niles to Kosti, some 200 miles south, carries a steppe vegetation of grass, bushes, and occasional trees. It allows of a certain amount of cultivation both of durra and cotton. It came under the influence of the ancient Nubian kingdom, and was indeed nominally Christian from the 5th to the 15th century, when it fell to the Arabs, to whom this type of country appeals very much. The Arabs mingled with the blacks and brought in many slaves; the result to-day is a hopeless mixture of peoples, and it would be a problem for an Honours candidate in Ethnology to say from what races some of the denizens of Omdurman have sprung.

There is a good deal of cultivation here both along the river and inland, more, indeed, than in any other part of the Sudan. The principal crop is durra, the maize and berseem grown so largely in Egypt being hardly seen. There is a great scheme afoot for irrigating the Gezira, the northern part of the so-called island between the Blue and White Niles, and making it grow cotton. In this same belt also occurs the cotton region of Kassala to the east of the Atbara river. This part of the country has a great future; much of it is suitable for irrigation; it is entirely under British management; there is plenty of water which could be made available and still leave Egypt with the quantity she has had before. Camels, donkeys, cattle, sheep and goats are plentiful.

The second belt in this great southern division begins near Kosti, as already stated, and becomes well marked south of Gebelein, 12° 30′ latitude. The rainfall is greater, grass and trees can therefore flourish. But the trees are all strange to us; it is a purely African flora, the desert north of Khartoum having kept out Mediterranean invaders. There are no palms, and the trees are mainly acacias of various sorts, rounded in outline, like many of ours. Indeed, the land looks very much like English park land, but it is all level as far as the eye can see. Neither Caucasian nor Arab ever penetrated here, the flies and insects having proved too much for their animals. The natives are the original pure black negroes, who have not been visibly influenced by the civilisations of the lower Nile, neither by the ancient Egyptian, the Arab, nor our own. They continue the organisation and culture adopted by the human race before the historic civilisations arose, and several, perhaps many, of their customs exactly resemble some of those survivals from ancient days mentioned by classical writers and in Genesis. The native huts are circular, made of bamboo-like reeds or stalks with a conical roof of the same material or of grass. There are no camels, donkeys are seen only at a few riverside stations, and there are no great numbers of sheep or goats. The natives are cattle owners, and cattle dominate their lives in a way we cannot understand; we seem to be back

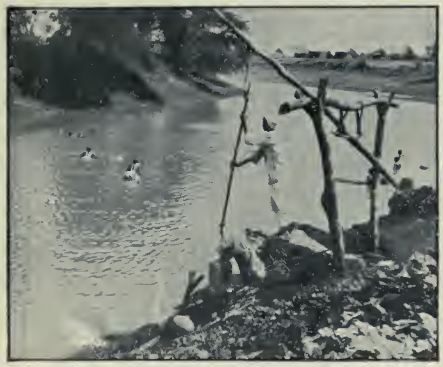
THREE-THOUSAND MILE JOURNEY UP THE NILE.

422'

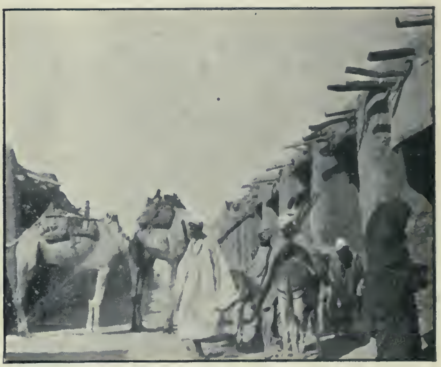


Group of Shilluks, White Nile,
Southern Sudan.

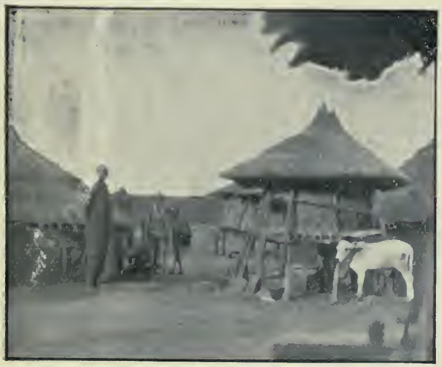
Shilluk in Canoe, White Nile,
Southern Sudan.



The Shaduf: Hand lift
for water irrigation.
Central Sudan.



Bazaar. El Dulim.
Central Sudan, Arab Country.



Granary at Juba, a Bari village.
Southern Sudan.

Typical woodland near upper
reaches of the White Nile.

in the days of Hathor, the cow goddess of ancient Egypt, and of the golden calf of Israel. The animals are never killed, and are eaten only when they die; they are never parted with for money, but only for the purchase of wives or for the expiation of offences committed. Among two great groups of natives, the Dinkas and the Baris, even the cattle excrements are prized. The cow dung is carefully spread out to dry by the women, whilst the liquid as it is excreted is used for washing the head, thereby giving the hair a curious tawny colour; and also for washing the milk vessels. Of the various groups or tribes the Shilluks are the most handsome and intelligent; they have progressed further than the others in the scale of organisation in that they have a king of supposed divine origin, who, however, as in pre-historic days in Italy, could be challenged to mortal combat by aspirants to the post, and held it only so long as he could defeat them. Their clubs and carvers exactly resemble those on the bas-reliefs of Egypt 3,500 years ago, and may well have been the descendants from the same original forms. The Dinkas, the most numerous of the cattle-owning tribes, are less advanced; they acknowledge no king and pay but little respect to their chiefs; they are organised on a family or clan basis, with rigid and definite rules. The family must be preserved, and when a man dies, his widow still must bear children to him, just as described in Genesis.

South of Tewfikia (lat. 9° 30′) the country changes; it becomes a vast swamp stretching some 300 miles from north to south and about 200 miles from east to west. Formerly this was probably a great lake, but it is apparently silting up; it is now a mass of tiger grass and papyrus, etc., collectively called "sudd." The region is monotonous in the extreme; it is extraordinarily unhealthy, and formed a veritable death trap for Europeans in old days. It was none too pleasant even in January, the best time of the year, when we were there. By day we were bitten by the serut fly and by night the mosquitoes were a great plague, sending us under the cover of the mosquito nets as soon as the sun went down; sending also English travellers in the country to bed at 5-30. These insects worry the cattle terribly, so that the Dinkas here are perpetually poor; they eke out their living by spearing fish and hippopotami, both of which they can eat long after the flesh has become poisonous to English people. Their culture is very remote from ours; the men wear no clothes at all, though none are without the necklaces of beads or the bracelets, which seem to constitute the first outward sign of human progress. Their lack of clothing is not due to lack of modesty, for they have a strict code of behaviour. Clothes are to them a badge of servitude, and they wish to be free. Many of the women wear a few leaves. We find it difficult to appreciate their culture and they to appreciate ours; we think them savages, they think us mad. But their organisation is extraordinarily interesting, as the survival, no doubt in a degenerate form, of one of the early chapters of the history of mankind.

There are dry parts in the Sudd where we see many antelopes and elephants; there are numerous lions and leopards; on the sand banks are hundreds of ugly crocodiles sunning themselves, often with their mouths open, while from the river hippopotami stick out their heads, look at us, and then disappear in much the same inconsequent manner as a clown at a circus. All over the area there are enormous numbers of birds of the most varied kinds.

This Sudd region is a great waste both of land and water. Reclamation would give the Sudan tens of thousands of square miles of fertile country, and it would give both the Sudan and Egypt an immense volume of precious water which here simply stagnates and evaporates. But the problem is one for the future; no feasible method of solving it is yet known.

The swamp ends near Tombe in latitude 6°, and from thence southwards to Rejaf (lat. 4° 30′) and beyond, the country is park-like as before, with much grass and many trees. There is no great forest as in the Congo, for the natives here burn the grass periodically to ensure a succulent young growth for their cattle, and in so doing they impede the growth of the trees. In the gardens planted by the missionaries and Government officials there flourish bananas, paw-paws, pineapples, dom-palms, and other tropical plants. We are now among the Baris, a race which, while no better than the Dinkas, wear a little clothing. Our journey ended here, and our last visit in Central Africa was to the Bari village of Logo, where we sat in the verandah of the chief's hut opposite the witch doctor's pole, watching the women smoking and preparing materials for making beer, while one of the boys, who had learnt some English from the missionary, told us about the people, their animals, crops, and other things that loom large in Bari circles. As we sat and talked we seemed to have travelled not only through space but through time. Starting from our home, the emblem to us of our Western civilisation, we had seen the Arab civilisation, changed but little for 1,000 years; we had gazed upon the relics of the wondrous civilisation of ancient Egypt; and now in this southern country we were right in the culture that had preceded it all, rooted back in the remotest antiquity. Herein lies the great charm of the Nile. Scenically many rivers surpass it; scientifically its interest is great, but its human interest is supreme. For in this valley we have before our eyes an epitome of the history of human civilisation; we can see the great pageant from its beginnings right up to its present stage.

* For an excellent summary see "The Nile Quest," Sir H. Johnston. Alston Rivers, 1906.

CYCLONES.

A NOTE FOR EXAMINERS AND OTHERS.

In view of the fact that in examinations and in teaching it is still usual to assume what was supposed some twenty years ago to be known of the relations of pressure and wind direction, it might be well to draw attention to a discussion which took place at the Meteorological Office a few months ago on the causes of cyclones.

The significant fact was that though the discussion occupied a couple of hours, and though the foremost meteorologists in England took part, pressure was mentioned only once, and then merely in an aside. The emphasis was laid on the interaction of masses of air with different humidities and temperatures and on the movements which should follow on these differences.

Prof. Bjerknes opened the ball with a paper which described his theory of how cyclones are initiated and propagated by wave motion at the boundary of two different layers of air, and especially at the polar front. Though it cannot be said that the meteorologists present accepted the theory, it was again extremely significant that not one denied the possibility of its correctness. Notwithstanding that much teaching and examining presupposes that we know all that is to be known about cyclones, Sir Napier Shaw could again stand up and say that he would like very much if any one could tell him what actually happened in cyclones or even in one individual cyclone.

The moral of it all is that teachers and examiners should be very careful as to what they do teach and ask in connection with what have been considered in the past to be definite meteorological facts.* J. Fairgrieve.

* Probably the very best short account of what is accepted is given in Mr. Dobson's paper read last January at the joint meeting of the Royal Meteorological Society, the Science Masters' Association, and the Geographical Association. This is published in "Meteorology in Education," by G. Philip and Son.

AMONG THE HIGH ALPS—A CLIMATE STUDY

LILY WINCHESTER, University of Liverpool.

ON the northern borders of Italy, at the eastern end of the ridge of the Pennine Alps, stands one of the most superb mountain masses in Europe. Like a group of giant statues carved from one block of marble rise the heights of the Matterhorn, Breithorn, Castor and Pollux, Lyskamm, and, pre-eminent even among these, Monte Rosa. On one of the peaks of Monte Rosa at a height of 4,561 m. (about 15,000 ft.) there is an Italian Observatory perched like an eagle's nest, clinging to the rock, a symbol of man's dauntless courage challenging these mighty solitudes, perhaps the only Observatory in Europe situated on the summit of a mountain. This Observatory is open each year for six weeks or two months, from about the middle of July to about the middle of September; there at this great height trained observers watch and register the continual variations in the daily march of the weather.

This summit station, with two other stations, constitute the "Observatory of Monte Rosa." The others are situated (a) at Col d'Olen, at a height of 3,000 m. (about 10,000 ft.) on the upper slopes of the mountain, and (b) at Gressoney St. Jean, a little village in one of the valleys radiating from Monte Rosa.

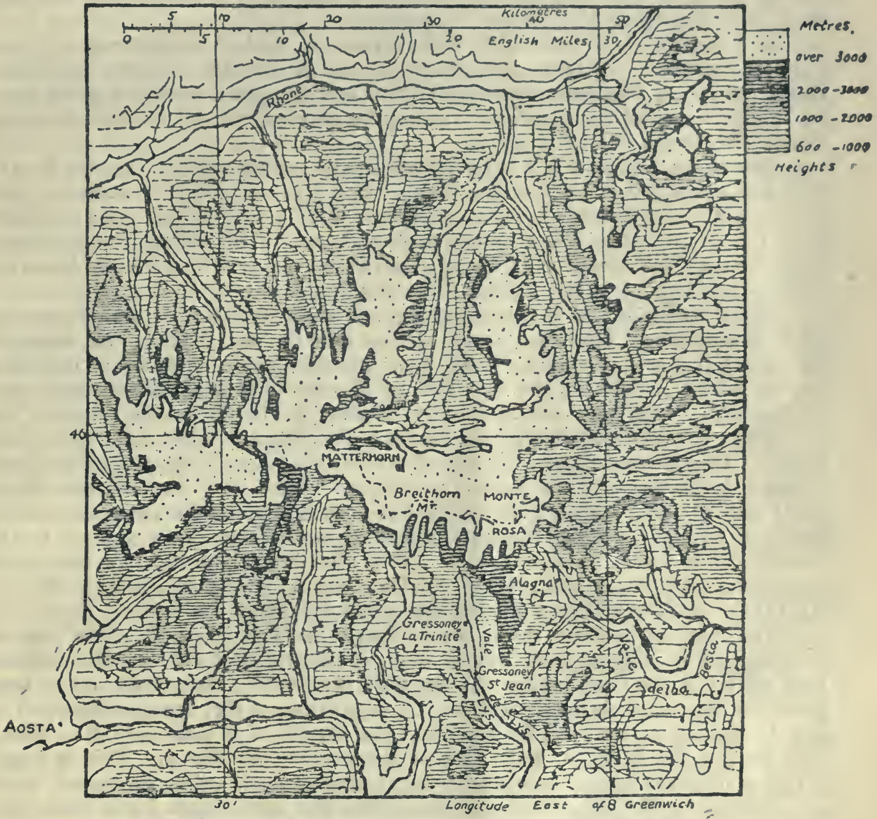
Through the kindness of the Trustees of the Lund Travelling Scholarship and the facilities given by Prof. Palazzo, Director of the Italian Government Observatories, it was possible for me to spend a short time at two of these stations in August, 1923, and to study the records of the third. The observer responsible for the three is Major Allesandri; he and Signora Allesandri proved themselves most kindly and hospitable hosts.

The observations taken at each of these stations include maximum, minimum, and mean pressure and temperature, relative humidity, wind direction and velocity; and these are registered twice or three times each day, sometimes more frequently still. At the summit station, called Campagna Margharita, the records show that the average pressure for the six weeks during which the station is open is 440 mm (17 inches), rather lower than the average pressure, 447 mm, registered during the months of August, 1890-92, at Des Bosses (Mont Blanc), which is 4,359 m. (about 14,000 ft.) above sea level. During the months of August, 1910 and 1914 (the two periods I selected for special study), the daily variations between maximum and minimum pressure were slight, viz., maximum 440.8 mm and minimum 437 mm, suggesting a very stable atmosphere. The temperature showed greater variations. Maximum temperatures 3° C (37.4° F) in 1910, on the 10th of the month, and 11.1° C (52° F) in 1914 on the 12th. The highest temperature occurred in each case near the middle of the month. Only four times in August, 1910, did maximum temperatures rise above freezing point, and this was generally on isolated days, but in August, 1914, 15 days showed a maximum temperature well over freezing. From the 9th to 15th inclusive, the maximum temperature varied between 0.5° C and 11.1° C, while from the 9th to the 13th the mean temperature also was slightly above 0° C. Very low temperatures usually accompanied by low pressures were recorded in August, 1910, eighteen days having a minimum temperature below —10° C, the maximum pressure being only 437 mm. The average temperature for the month was —7.6° C in 1910 and —3.8° C in 1914. Daily variations of 15° or 16° accompany a stable pressure distribution, and temperature changes in this case appear to bear no relation to wind direction.

Sudden changes in relative humidities are quite usual at such high elevations, and at this Observatory a humidity of 24 per cent. follows one of 80 per cent. Probably these variations are due to the presence or absence of a cloud cap. Contrary to usual experience wind from any particular direction is not associated with any special percentage—a very high humidity and also a very low one accompany a wind from the S.W.; while a humidity of 94 per cent. is found on a day with a maximum temperature of —3° C and one of 32.3 per cent. with a maximum of +9° C. Again, contrary to accepted ideas, wind velocities are by no means high. The greatest velocity occurred on August 28th, 1914, when the wind attained a speed of 44 km (i.e., 27 miles) per hour. This is a "strong breeze" according to the Beaufort scale. It is sufficient to set large branches in motion, but quite insufficient to sway the trees themselves. It is possible that the two months were exceptional for their gentle air movement; but this is unlikely, perhaps this slight movement is due to the relatively high pressure conditions, characteristic of summer in all mountain areas. A low barometer was not always accompanied by rapid air movement. There were two days on which pressure was very low, one when the maximum and minimum respectively were 434.4 mm and 432.5 mm and the other 438.8 mm and 432.2. On the first of these days the wind blew at a speed of 3.3 km per hour, and on the second 40. km per hour—a striking variation.

These statistics show the summer climate on Monte Rosa's summit, and though these observations cover a very short period they are in general agreement with those of other mountain areas. For the winter there are no statistics—no human being could remain there during those months. The fierce winter storms, the blizzards of snow, sweep over these vastnesses in unobserved and unrecorded fury.

Immediately below the summit of Monte Rosa at a height of 10,000 ft. stands the second of the three stations of the Observatory, situated at Col d'Olen, overlooking the Valley of the Sesia, and here the Laboratoire Internationale has been built. This Laboratory is virtually a department of the University of Turin, and serves as a centre for physiological and other forms of research, as well as for a climate recording station. Like the summit station it also is open for six weeks or two months during the summer. I had the privilege of staying here for four days. Life at the Laboratory is very interesting; it is remarkable alike for its simplicity, and the sincere and charming courtesy which characterises all the workers in their dealings with each other. From August 11th to August 14th of 1923, i.e., during my visit, about ten professors and four students were in residence, the professors representing the Universities of Cagliari, Milan, Naples, Pisa, and Turin. Prof. Herlitzka (Turin) was the Director, and proved a most efficient and kindlv host. Climate records have not yet been taken for any length of time, but the observations which I consulted corroborated the information given to me by Prof. Herlitzka, that the summer of 1923 was exceptionally hot. On August 11th the maximum temperature was 17° C (63° F), this at a height of 10,000 ft! Not once during the first twelve days of August did the thermometer fall to freezing point. The days were almost cloudless, and Monte Rosa with her glistening snows stood up in sharp relief against a background of clear blue sky. The sun rose about 5-30, and an hour later the heat was very great. Soon after 6-30 in the evening the shadows began to creep over the mountain sides and night followed rapidly. High temperatures at such great altitudes are frequent during summer, compare Beowawe, Nevada, 4,695 ft. with a mean July temperature of 77° F, as quoted by Kendrew—"Climates of the Continents." Radiation is very intense, because of the rarefied air and perhaps also of the lack of dust particles, and there is a wide diurnal range of temperature. (These facts are of vital importance in relation to white settlement on lofty plateaux in tropical regions). Here again an interesting aspect of the weather during the period of my visit was the gentleness of the air movement. There was no wind, and this is apparently a characteristic of this period of abnormal heat. The absence of wind helped to intensify the utter stillness among these great heights—the silence was profound, broken only by the faint murmur of tiny glacial streams, or the cannon-like roar of an avalanche.



MONTE ROSA *and its* ENVIRONMENT

The immediate surroundings of Col d'Olen are more interesting than beautiful. On the north stands Monte Rosa, solitary and dominant; immediately in front there is a broken and irregular platform of rock extending roughly about a quarter of a mile and sloping gradually to the south. This rocky platform ends abruptly, and the mountain descends by sharp gradients to the Valley of Sesia. The surface of the platform is covered with a ragged mantle of rocky debris, which completely hides the irregularities of the rock beneath. The scene is one of utter confusion. The struggle waged between the everlasting hills and the weather is an unequal one; it is the hills that succumb and crumble. Looking out from the platform in front of the Laboratory one sees mountains—North, South, East, and West, everywhere mountains—a world of mountains.

The vegetation at Col d'Olen is restricted by the prolonged cold of winter and the strength of the winter winds. It is a marginal region; here phanerogams cease and above this only cryptogams are found. The flora is still rich in variety, though the number of the individual plants of each species is not great. Gentians, Alpine chrysanthemums, forget-me-nots, violets, and many varieties of grasses are found.

There are many beautifully coloured butterflies and moths, very small but very lovely. There are no birds except the swifts which fly over the mountains in the course of their migrations, and though there are some mosquitoes, they do not sting.

The journey down from the station at Col d'Olen to the station in the valley is a long and difficult one, the paths are obscure and frequently very steep, but the mountain scenery is splendid.

Gressoney Trinité is the first village reached, and about five miles further south Gressoney St. Jean—the third station of the Observatory of Monte Rosa. A motor bus runs between Trinité and St. Jean, and is a great boon to the footsore and weary, though it may be necessary to sit in the vehicle for nearly two hours before it starts.

Gressoney St. Jean is a little village in the valley of the Lys, at a height of 1,385 m (4,200 ft.) above sea level. The Lys, a turbulent stream, rises in one of the glaciers on Lyskamm, Monte Rosa's neighbour, and eventually joins the Dora Baltea a few miles north of Ivrea. The village is a scattered one, the north or newer part being separated by a stretch of fields from the south or older part. The valley, wide and flat, is a typical U shape.

The distribution of the sunlight here is characteristic for valleys among high mountains. The east slope of the hills is not fully in the sunlight till about 8 a.m. By about 5-30 p.m. all this slope is again in shadow, except where breaks in the sky line of the western mountains admit rays of sunlight. One may say, generally, during the height of the summer the valley has sunlight for about nine hours a day, twilight and night for fifteen hours. This is interesting, for elsewhere in this latitude the daylight during summer lasts normally for fifteen and a half hours and the darkness for eight and a half hours. This valley has approximately the same number of hours of daylight during summer as flatter and more open regions in the same latitude have during winter. The nine hours' sunlight in the valley makes an interesting contrast to thirteen hours' sunlight at Col d'Olen, 10,000 ft. up Monte Rosa, during the same period of the year.

The sun reaches the valley only when it is high in the heavens and its heating power is great. It will be seen, therefore, that the rise in temperature after the sun once surmounts the hills is rapid. This rapid rise in temperature has a deleterious effect on the vegetation. But the prolongation of low temperatures and the lack of sunlight permit of a long period in which dew lies on the fields, and the dew is frequently very heavy. This is again a factor of great importance to the vegetation of such valley regions.

Owing to the height of the mountains the sun shines for a very brief time each day during the winter months, hence the temperatures are low. In January, 1922, a minimum temperature of —14°C (6°F) was reached. But during winter the sky is frequently cloudless and the storms of snow and rain last only for a short time. In January, 1922, there were three days in which there was a cloudless sky and only four in which the sky was covered with clouds all day. This cloudlessness is one of the great characteristics of the winter climate in these Alpine Valleys.

The föhn visits the valley at times, and its effects are clearly seen. Just before this wind is definitely established there is a rapid oscillation of temperature, followed by an abrupt rise, as the föhn strengthens, and as it dies out the temperature gradually falls. Such a wind was well developed during the early days of January, 1922. On December 31st weather was normal, and at 6 a.m. on the first of January a minimum temperature of —5° C was recorded. As night approached the thermometer began to rise, and between 6 p.m. and midnight rapid variations between 2° C and 6° C were observed; by mid-day on the 2nd the temperature had reached 10° C. It then slowly declined. Pressure gradually fell during the whole period of the föhn, and continued to fall after temperature had become normal. It was

647 mm (25.4 in.) at 9 a.m. on the 1st, and 627 mm (24.6 in.) by 9 a.m. on the 4th. The regularity of the fall was broken on the 2nd, just when the temperature had attained its maximum the falling pressure rose to 647 mm, and then continued its fall. The wind was very strong during the whole period of the föhn, varying slightly between north and north-west; some rain fell, but for the greater part of the time the sky was clear.

As at Col d'Olen, so also at Gressoney St. Jean, the summer of 1923 was unusually hot. During the early part of August the temperatures were high and the days beautifully clear. Between the 3rd and the 17th very little rain fell, the only shower of any importance being during the night of the 16th after two or three hours of continuous lightning unaccompanied by thunder, during which the valley was at one moment brilliantly lighted and the next plunged in utter darkness.

The valley in the district of Gressoney St. Jean lies almost due N. and S. Air movement was not strong, though it was much stronger than at Col d'Olen, and the change of direction in the early hours of the morning was very intere ting to watch. On the east side of the valley there was a large chimney ; about 7-30 a.m. the smoke from this chimney drifted slowly southward, hugging the side of the mountain, and, rising very slowly, covered it with a delicate filmy veil. About 10 a.m. the smoke had changed its direction completely and was carried slowly north. There was no filmy veil in this later movement, hence apparently the upward movement of the air was not very strong at this hour.

All the agriculture in the district of Gressoney St. Jean is confined to the lower slopes of the mountains and is poor in character. The valley floor is given up to permanent pasture ; obviously grass will suffer little from rapid variations in temperature and will benefit by the prolonged hours of dew. But it is very unequal in quality, yellow patches of dead or dying grass, contrasting strangely with the vivid green of the living, appeared like desert islands in an emerald sea.

There were no sheep or goats in the valley in August, but small groups of cattle, each group tended by a cow-herd and his wife, were frequently seen. The picturesque peasant dress of the woman, red skirt, black corsage and embroidered vest, added brightness to the scene, while the clang of the cow bells, although it can hardly be described as musical, was very pleasing.

The language of the peasants is, of course, Italian, but many of the phrases in common use are of German origin. It is believed that in days far removed a little community from one of the German cantons of Switzerland journeyed south and settled at the head of the valley of the Lys and of its sister valley, the Sesia. Among the peoples of these two settlements a dim memory remained, or, to state it somewhat differently, a legend grew up concerning this migration. This memory, tantalising in its indefiniteness, inspired some of the more venturesome to go out and find their former home, their "Lost Valley," beautiful as all lost valleys are. On August 15th, 1778, therefore, a party of young men set out to climb Monte Rosa and to look beyond its snow curtain and see this valley. The party reached a rocky tooth about 4,300 m (14,325 ft.) in height situated just to the west of the great opening of the Lys joch, not far from the summit of Monte Rosa. They looked down into a great hollow ; unfortunately it was not a valley beautiful, and could never have been one. Other ascents were made later, and eventually the climbers reached such a position that they could see in the distance pastures and men ; this was the Zermatt district, part of a German canton, not far from their original home. Unfortunately even this land was no El Dorado; but the ascent was a real achievement, and to-day on the tower of the church in Gressoney Trinité there is a tablet to the men who first dared and who succeeded in climbing some of the mighty peaks of this Alpine giant, Monte Rosa.

FARMING IN TUSCANY.

DONALD GRAY, Bootham School.

TOO often the traveller in Italy is led unresisting along frequented ways, through the shady arcades of mediæval towns or the cloisters of old monasteries, by the sides of beautiful lakes, or the rocky shores of the Mediterranean. Too often the treasures of a great past, and the natural beauty of an exquisite countryside, distract the attention from the real life of Italy, which, as in France, is to be found among the peasantry. For these reasons, the following notes may be of interest to those who have not had the opportunity of living on an Italian farm. The writer once lived for more than a year on a farm in Friuli; the present notes, however, were made during a short stay on a small farm near Florence in April, 1923.

In a little sun-kissed pocket on the slopes of Monte Morello lie a number of small farms, of which one is called Le Catese. Behind it rise the rich brown slopes of the Appennines. On the top of the mountains a sprinkling of late snow shows clear white against the blue sky. White dusty roads, lined with sombre cypresses, wind steeply up the sides of the valley to some mountain hamlets, and a little grey-green stream tumbles down its rock bed, through deep creeper-hung ravines, to the plain below. Here that good man, the sturdy hard-working Tuscan contadino, seems to live his life in ways hardly differing in essentials from those of his predecessors, when the Etruscans built those massive walls at Fiesoli, or, in later days, when Horace dwelt on his Sabine farm.

> " Happy—who far from turmoil, like the men
>   That lived in days gone by,
> With his own oxen ploughs his native glen,
>   Nor dreams of usury!
>
> His maiden vines it is his gentle craft
>   With poplars tall to wed;
> Or the rank outgrowth lopping off, ingraft
>   Fair branches in its stead;
> To watch his kine, that wander, lowing, far
>   Into the valley deep:
> Store the prest honey in the taintless jar,
>   Or shear his tender sheep.
> And soon as Autumn, with fair fruitage tricked,
>   Peeps o'er the fallows bare,
> Then with what glee his purpling grape is picked,
>   And newly grafted pear."

The farm consists of the following buildings:—One large house, the upper storey of which is divided into two separate dwellings—that of the padrone (in this case an English gentleman) and that of the contadino (the farmer). Below the padrone's quarters are his cellars for wine and olive oil, and a small room with a very primitive oil mill. Below the contadino are his cellars, stalls for a pony and one or two oxen, and a shed for the cart and farm implements. The outbuildings consist of a small garage, a wine press, a wood store, a threshing floor, and a very small bakehouse, where the contadino's tireless wife makes bread about twice a week.

In this case our farm is not quite typical. It is only on the smallest farms that the dwellings of the padrone and contadino are in the same building. More often an estate consists of several farms, each worked by a contadino, with a factor's house in the neighbourhood. As might be expected, the land is better tilled and the relationship is better in the case of a single farm.

FARMING IN TUSCANY.

Ox Cart.

The Farm from N.E.

The Farm from S.W.
Vineyard and Olive Trees.

Immediately beside the farm buildings are the padrone's flower and kitchen gardens, a shady central courtyard with a splashing fountain, and the contadino's kitchen garden. Then on the steep slopes of the hill there is the terraced " podere " with its rows of olive trees, with the vine trailing in festoons from tree to tree or trained up the terrace walls; and in between the trees and the vines are various crops—wheat, maize, lucerne, oats, barley and hay. Lastly, on the least sunny slope, is the Bosco—the typical Mediterranean maquis—with cypress, broom and juniper, and a little rough pasture for goats and oxen.

The farm is worked on the " mezzeria " system (French metayage). The padrone or landlord supplies the land, buildings, implements, live stock, half of the seeds, manure, etc. He is also responsible for repairs and general upkeep. The contadino supplies his labour, skill and experience—together with that of his family, which, in this case, consists of a father, a brother, a wife and a very small daughter, who watches the cattle in the Bosco whenever she can get away from school. The produce of the farm is strictly divided between padrone and contadino, except the fodder crops, which go to the cattle, of course. The contadino adds to his small income from the sale of produce by carrying out repairs (for which the padrone pays him at a fixed rate per hour) or by carting for the neighbouring miller. These odd jobs roughly pay for his share of the seeds and chemical manures. The Bosco belongs entirely to the padrone. Both parties share in the payment of rates and taxes.

The system as here described is strictly in accordance with the " Patto Colonico " (the peasants' pact), as established by decree for Tuscany. It is therefore typical. It appears to be thoroughly suited to agriculture in regions where the produce of the land has not to be gathered and disposed of at one season of the year, as with us in Britain. Throughout the year there is always some crop to be gathered and disposed of. It is found working in Southern France, Portugal and Greece, as well as in Italy.

Work on the farm is continuous and hard throughout the year. The contadino told me that he had to visit each vine about fifteen times a year, pruning, tying and staking, spraying, weeding, manuring and picking. The olive trees also have to be pruned and manipulated so as to get the full benefit of the sun. The land has to be ploughed and manured, the seed sown, and the harvest gathered in due season.

The following is a calendar of the more important operations in the contadino's work through the months:—

January.—Gather olives from the trees for the first quality. Pick up fallen olives for the second quality of oil. Storing and preparing for crushing. Oil making.

February.—End of olive gathering and oil making. Beginning of vine pruning. Ploughing for the Spring sowing.

March.—Pruning of olive trees and vines. Sowing of barley.

April.—Staking and tying up vines. Olive tree pruning terminated. Sowing of potatoes and maize.

May.—First spraying (copper sulphate) of olive trees and vines. Hay cutting. Tying up shoots of vines.

June.—Spraying vines and clearing from vines of too abundant leaves. At end of month, reaping of wheat. Spraying sulphur powder on young grapes.

July.—Spraying olive trees and vines. Threshing. Tying up long vine shoots. Sowing winter green fodder.

August.—Spraying olive trees. Ploughing and hoeing. Sowing barley and beans, for green fodder.

September.—End of ploughing and hoeing lines of vines and olives. Preparation of thorn hedges to protect the grapes from thieves. Removal of young shoots from olive trees. Gathering of the grapes.

October.—Removal of wine from the vats to the cellars after first fermentation. Beginning of the Autumn sowing—oats, grass, etc.

November.—Sowing of wheat. Hand finishing (hoeing) of vine lines, furrows for rain-water, etc. Sowing beans and other small crops.

December.—Beginning of the olive crop.

It should be noted that this calendar refers to the cultivation of the lower slopes. The dates would all be later for the higher farms and villages. The land is cultivated almost to the tops of the hills, though higher up sheep are more in evidence, but never very important. Tiny hamlets can be seen on the sky-line, perched on cols between two valleys, with diminutive churches and market squares.

The contadino's income from all sources is not large, and he is always living on the margin of poverty. The loss of one cow may mean serious hardship. The following table shows the relative values of the different crops on this small farm for 1923-24. It is the contadino's share estimated in Italian lire (£1 is roughly 90 lire) after all costs have been deducted.

Wheat	lire	564.30
Wine	,,	1,008.0
Oil	,,	1,817.20
Oxen	,,	1,117.50
Olive refuse	,,	106.95
Maize	,,	90.0

He adds small sums from the sale of fruit and by doing odd jobs, and the farm, of course, supplies him with a large proportion of what he needs. Still, when the family has been clothed and the taxes paid, there is not much left over.

Relations with one's neighbours are not always easy. The people at the head of the valley go in for sheep farming in a small way, and their sheep often invade the Bosco and work havoc among the small trees. The stream has to work for a great many people on its way down the valley. It works for three millers: one of them grinds corn, another makes blasting powder, and a third makes "Terra di Siena," a red colouring matter. It is led off through countless little channels to irrigate the vineyards, and in its rough passage it is always liable to undermine terrace walls and cause boundary disputes. The water rights of the valley are held by a special individual, who sees to the husbanding of the water supply, and who charges for his services.

Lower down the valley is a famous factory of porcelain, which employs all the surplus labour of the valley. It was founded in the 18th century by an enlightened and progressive gentleman, when such people were rare in Italy; and although the local supply of clay has long been worked out, the industry continues to flourish by reason of its good reputation.

Lastly, the little valley community finds its social and economic centre, where it opens on to the plain, on the road from Bologna and Prato to Florence. Here is the broad sunny piazza, with its church and the municipio, and the terminus of the trams from Florence. Here the farmers bring their produce and the women sell their long strings of plaited straw, which they make in their spare time, as our fisher lassies knit their shawls.

One can spend many an interesting hour here watching the life of the place. If one is lucky, one may be privileged to witness the sale of a horse and cart. That is always an interesting business, though it is sometimes difficult to pick out the principal actors. The horse and cart are generally so small as to be lost in the crowd. The prospective purchaser, however, may be picked out by his extreme aloofness and a tendency to stroll off into the tavern. This brings the owner to the front, and from this point the proceedings may or may not be rapid. They will certainly be animated; but it is seldom that a tramway driver will wait more than a quarter of an hour to allow his passengers to see the end.

Tuscany has been called a region of increment. If this simply refers to material prosperity, our contadino, Fausto, would have much to say on the matter. He would discourse with considerable vigour on the difficulty he has to make ends meet. The patient peasantry has to bear a burden out of all proportion to that of the industrial workers. But if the phrase means spiritual riches, it is surely very true. It would be a dull soul that did not respond to such beauty. To sit on a sunny hillside on a hot still morning; to listen to the hum of insects round a neighbouring fruit tree; to watch the great white oxen drag their creaking carts up the steep tracks; to look out between the dark cypresses over the blue grey olive trees to the white walled villages of the plain and the domes and spires of Florence in the distance, is to share the bright vision of Botticelli and the passionate love of Dante, the exile.

Teachers of geography would be much helped if those of their colleagues who know of frequent " round journeys " performed by cargo boats either before the war or at the present time would be so good as to send descriptions in summary form on post cards to the Central Office of the Association. The old Atlantic round-trip of the xviiith century with cotton and other American products to Britain, with guns and small ware to Africa to secure slaves which would be exchanged in the West Indies for rum and sugar and the like for America (and England, too), is an important fact that we all need to help us to understand several problems. We forbear from suggesting modern examples, but make a special request to readers to send us some, so that a good collection may be published with names of contributors in a future number.

Teachers ask about the climate of the highland above the eastern projection of Brazil, as this is a well known dry patch with thorn-forest (caatinga). Even the coast itself is here curiously dry in spite of the fact that it catches the moist trade winds and that these winds bring abundant rain to the coast and hills a little farther south. There is doubtless a good deal to be argued here, and one notes an apparently similar dryness around the north end of Madagascar (map in G.J., Vol. XII, p. 66), though here again the moist trades bring abundance of rain farther south. And the case of Cape Comorin can be considered analogous in a small measure, while that of Cape York is less decided. In each of these cases a current is divided by the projecting headland, and as land and sea breezes are breezes of the distinctly lower atmosphere, the winds, including the trades, must be similarly divided. These divisions are supposed by some to give opportunity for cooler air to sink between the dividing streams and for cooler water to be drawn up to a slight extent off shore just where the current turns. These and probably other influences account for the relative dryness of the promontories named, but the subject needs longer treatment, and the Editor would welcome a documented article.

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SACRED CITIES.

CHIEFLY IN THE EUROPEAN QUADRANT OF THE WORLD.

A GENERATION ago we knew very little of the world before classical times, and the Phœnicians were thought by most people to have been the first organised sea-traders; ancient Egypt stood alone out of the darkness of the remoter past, though there were glimmerings of illumination concerning mighty Babylon. A new avenue to knowledge has been opened up by the work of the archæological geographers, who have studied distributions of ancient finds and have shown us that intercourse, even intercourse over long distances by sea, has been a feature of the life of humanity for a longer time than most people imagined. In this field the pioneer work of Déchelette and of George Coffey may be mentioned with special appreciation, while H. Peake in this country has set a fine example of laborious care in the accumulation of accurate data, and Leeds, Crawford and Fox have followed him. Elliot Smith and W. J. Perry have been tempted to make broad generalisations which are much disputed, but we may at least appreciate the stimulus their bold guesses provide.

It is now known that long distance intercourse by sea and land dates back beyond the spread, even perhaps beyond the origins, of metal culture; that is, in Western Europe, probably centuries beyond 2,000 B.C., and who shall say how far back in the Eastern Mediterranean? Already at that time the early city at Troy (Hissarlik II of the excavators) had had its day and ceased to be, and Cretan sea power had already spread the fame of Minos, whose ships were as the gulls of the sea-shore for multitude.

Since that remote time there have been many changes in the fortunes of routes and stations, but some have persistently held men's feelings in one way or another, and it is largely from among these that the holy ways and holy places of our quadrant of the world have grown.

If we try to glimpse some facts of man's evolution with our thoughts fixed on the matter of holiness in its relation to sites and ways, we proceed from the vaguest of surmises to clearer information before the Stone Age reaches its end.

As far back as Mousterian times men already buried their dead with care, and thus, according to many, had some dream of the personality's survival of bodily death. This may be inferring too much, but when, in the later Palæolithic burials, we find social cemeteries, ornaments and implements set apparently for the use of the dead, and skeletons treated carefully with red ochre, we cannot but infer that men had fairly definite dreams of a life beyond this one, and that they may well have begun to have special feelings, of veneration or of fear or of both, for the place where the dead were laid. It is well known that the change from Mousterian times to later Palæolithic Times in Western Europe carries with it a change from an older type (Homo Neandertalensis) who spoke little, according to Elliot Smith, and walked bent and bowed, to the earliest of modern types, who already showed the enlarged brain with its evidence of capacity for speech and speech memory, who in more cases walked almost erect, and who showed a far more varied and far-reaching initiative than their predecessors. We can have little doubt that they had holy places in some of the great caves, where, in dark recesses, modern explorers find frescoes and reliefs which have excited such wonder during the last thirty years. But nothing, so far as is at present known, has been handed down concerning these most ancient holy places. The men of those days were hunters on the cold grass lands which occupied much of the surface of Europe while the ice-sheets and glaciers of the

Great Ice Age were still lingering near the mountain ranges of the centre and the high moorlands of the North. With the final retreat of the ice and the sinking of the continental shelf, so that Atlantic water could get far more freely into the Norway Sea, the North Sea, and, for a time, the Baltic, the old life faced a great crisis. The wet westerly winds were no longer kept out by the cold heavy air over land ice-sheets, and they got in over the land north of the Alps, and spread forest at the expense of grass land, making life hard if not impossible for the men of the time who had been hunters of the great beasts of the grass lands. Archæology is beginning to give a sketch of decadence of the old life, with survivors for a time here and there living very poorly on shell fish of the shore and the like. The old caves and the old art were forgotten; it was not these early sanctities that were handed down so far as we at present know.

In South-west Asia the climate had been wet and fairly mild, while the furies of the ice reigned in Europe, and in forests somewhere in that part of the world men were learning other lessons. Pottery was coming into use, though its origins may go back a little beyond this; stone axes with transverse edges useful for wood splitting, and shaped by grinding, were becoming a general feature. Evidences of the beginning of care of plants, leading to cultivation of cereals, and, perhaps a little later, to the keeping of animals for future food, begin to be avaliable. The mountain valleys of Central Europe began to grow forests where once glaciers had ground their way along, and men with the forest-culture began to spread. By and by they made collective homes in the Lake Villages of Switzerland, and their arts spread over western Europe bit by bit. In the older time men could chip effectively but few kinds of stone save flint and chert, but now there were many varieties of stone in use; many hard crystalline rocks could be ground and, if necessary, polished, and the sources of such stone came to have widespread importance. Questing journeys began to have extra interest.

The spread of pottery and the increased use of fire, with abundant wood supplies, seems to have led to the trying of stones in the fire, and somewhere or other, perhaps in more than one place, the discovery was made that stones of certain kinds might be softened by heat, shaped, and then cooled in the desired forms. This was one beginning of the great discovery of metal. Another may well have been due to man's love of glitter, flakelets of gold in many a stream could be collected on woolly fleeces fixed in the water. Gold and Copper, and later Tin also, became objects of quests that now took on an immense cultural importance, for the questing travellers came equipped with what to the natives they met must have seemed magic skill. The contact between richer and poorer cultures at some early sources of metal seems almost inseparably linked with the rise of great stone monuments in some regions, though he would be an over-venturesome speculator who would make metal-seeking the only or even the ruling factor here.

At any rate, from the period when dependence on stone was coming to an end, we have evidence of the spread of cultural influences between the Iberian Peninsula, France, W. Britain and Ireland, S. Sweden, Denmark, and N.W. Germany.

The evidence is in the form of the earliest great stone monuments of diverse types, some showing local peculiarities with hints of cultural influences from other lands. That they betoken culture connections between Iberia and Scandinavia no one can well deny. Elliot Smith goes farther, and thinks the idea of these monuments came from Egypt, but his views are hotly repudiated by some others. It seems fairly agreed that some great stone monuments, and especially those which are found in Syria, India, the Far East, and the Pacific, are much younger than the first ones of the west. The controversy as to origins hardly concerns us here; we may turn our thoughts rather to facts of continuity of sanctity, which now begin to take on a great importance. Just as, it may well be, the old culture of the kitchen midden makers (living on shell fish) dragged on almost to the time of the great stone monuments in parts of western Europe, so also the civilization that gathered round those monuments lingered on, it would seem, to historic times. Early Church Councils condemned and threatened those who worshipped great stones, the Early Church strove to Christianise centres it could not destroy, and we have the strange case of the dolmen at Confolens (W. France), where carved pillars of the early middle ages form the supports of a dolmen also; a church in Wales has around it remains of what was doubtless a circle of great stones, while a great deal could be said concerning strange rites still performed in the twentieth century near great stone monuments or at the places they once occupied. We shall probably not be far wrong if we think of many of the earliest of these monuments as centres of a superior culture spreading awe of mysterious powers in the region round about them. Many of them are near the sea, and may well have been stations of men of superior culture arriving in a far land, centres to which natives would come to trade and to wonder, centres also whence the idea of making such monuments would spread along the ways that led to them, just as in later times subordinate sanctities have so often grown up along the ways to some famed sanctuary. The marking of ancient ways by monuments, whether of stone or of earth, is a very characteristic feature in several regions of Western Europe.

In the story of Abram we read of his journey, probably as a shepherd-trader from Haran through Palestine by way of Shechem, Bethel, Hebron, and Beersheba, stations of lasting importance, around which many traditions of sanctity gathered in the course of time. Abram built an altar at Bethel, and in a later story we hear of Jacob sleeping there on his way to Haran, and set up a stone for a pillar in memory of his vision. From a later time we hear of Shechem and Hebron as two of the cities of refuge or sanctuaries appointed by Joshua, and already in the book of Joshua another station on this road, namely Shiloh, begins to be mentioned for its sanctity. These are but a few among many indications of sanctity associated with what may be described as stations along a trade route, sanctity which clung to some at any rate of these places, as later history shows. We also glean the idea of stone monuments associated with these holy places.

These considerations help us to understand one of the most famous of all sacred cities of history, namely Mecca. It is a station of special importance on the trade way from Arabia Felix (? Sheba) northward. Near Mecca came, for these traders in frankincense, the rough contact with the immense Hurras or areas of rocky lava near the edge of the high Arabian plateau. To avoid the worst a difficult descent was made down that edge towards the coast with a reascent that led to Medina farther north. From Medina routes diverged in various directions. Mecca is thus a town that has grown up at a point of change in the character of a trade route, a place of multiple exchanges and contacts, and also a place where spiritual protection might well be sought by traders before facing the trials of the northward journey or where thanksgiving might be offered on the return. That the sanctity of Mecca is far older than Islam is well known from the fact that here at the very heart of Islam is reverence paid to a material object, the famed black stone or Kaaba; a feature out of harmony with the ideals of Islam, but obviously so strongly rooted that Islam had to adopt it. Facts concerning other desert stations forbid us to rule out another factor, namely that not seldom persecuted sectaries or other repositories of enthusiasm have tried to found a Civitas Dei according to their own ideas, and in the course of that work have made the desert blossom as the rose. The case of Mecca has its analogies with that of Santiago da Compostela in North-west Spain; the veneration of which has been so fruitful of contributions to European life. In the early Middle Ages it grew to fame as the shrine of St. James the Great in the west of that hill country which most stoutly resisted the domination of Muhammadan armies, and so became deeply linked with the Christian Church and the Crusades against the Moors. Then crusades led to pilgrimages, and the tales told by crusaders and pilgrims on the way to Santiago are among the prime contributions to French literature. The Route de St. Jacques, with its many minor sanctities and its many evidences of the spread of Gothic architecture, southward from the Paris Basin through Bordeaux, Bayonne and Léon, is one of the best of our western examples of a Holy Way. But pilgrims also came by sea from Ireland via Pembrokeshire, Cornwall and Brittany, using ports at St. David's, St. Catherine's, Tenby, Llanfihangel Abercowin, and Padstow at least.

Recent investigations have shown that the veneration of Santiago is associated with reverence for a number of more ancient sanctities, including especially great stones at Padron near by, and it appears that gold ornaments of ancient type are still treasured at Santiago. One must hesitate to assert that the stone monuments immediately concerned date from the earliest period named for those monuments, but North-west Spain is famous for such constructions. Leeds has urged that the Iberian peninsula is the place where this type of construction originated, though many others would dispute this, while allowing that the art of building these monuments reached the peninsula early. Whichever is right, there can be little doubt that in the mediæval and later pilgrimages to Santiago da Compostela we have a late phase of something that goes back to the days of the earlier great stone monuments directly or indirectly. Moreover, North-west Spain is famed for its vein metals, though as yet we know all too little about the locations of early workings. Further, we have evidence in the monuments, and some would say in early legendary history as well, of prehistoric maritime links with Brittany, Cornwall (Padstow), Pembrokeshire, and the east of Ireland, and there may be other convergent lines of evidence as yet hardly worked out at all. Whether there is an approach to continuity or not it is too early to say, but there has at least been a worship of the great stones and what must be either persistence or revival of the sea route concerned. Santiago supersedes Padron as the focus behind a number of ports of which Padron is one. Santiago illustrates very well the idea of a focus behind alternative ports which gave to the little ships of old increased chances of arrival, struggling against wind and tide.

It seems then legitimate to think of Padron, and Santiago as the focus behind it, as a centre of great stone monuments with some importance as an entry, from the sea, into this region. Saint David's in Wales was recently described in a "Times" article as a sanctuary built in a remote and difficult spot, and this is quite legitimate if we argue merely from modern times. In the days of the early Church, however, Glendalough in Co. Wicklow was a renowned centre whence missions spread, and we know that they came thence to St. David's over the narrowest crossing. The Cathedral is not on the coast, but about a mile inland, at the focus of a number of ways from different landings on the two sides of the westwardly pointing St. David's Head. Not only so, but we find, on and near the headland, a number of great stone monuments, and once there may have been many more. Also the various landings are known as pilgrim places, and some have chapels connected with the old pilgrimages. A still further line of evidence is folk tale. These tales in the district concerned deal mostly with traders from the sea who pursued the "silent trade," and who, according to one of the best known tales, had a secret underground store of gold balls in the headland. Here the prehistoric, early Christian and mediæval evidences seem almost continuous with one another; they combine to give the architectural glories of St. David's associations that help the reverent visitor to understand very vividly how a place comes to be holy. St. David's may well have been in the Bronze Age (lasting almost if not quite down to Roman times in the West) as well as in early Christian times the gate of entry of a richer culture into Wales.

One cannot but think that somehow or another this factor operated in the case of Canterbury. That it decided the location of the Archbishopric is clear from history. That it was also one factor of the pilgrimages using the "Old Road" of Belloc's essay is probable, and to credit this we need not dispute in any way the influence of traditions of sanctity that grew around Becket's tomb. Canterbury, like St. David's and like Santiago, is a focus behind a number of ports (Cinque Ports), and through Canterbury, at least since the advent of the Roman Church in England in early Saxon times, have streamed into England the greater portions of our inheritance of civilization from the Mediterranean and from France.

The case of St. Andrew's in Scotland is much disputed. Some think it a case of a famous shrine growing up around an original hermit's cell in a spot chosen because it was remote. Others fancy that St. Andrew's acted as a focus for a number of ports around the Fifeshire coasts, and was an entry from the continent in that way. The latter hypothesis would bring St. Andrew's into line with the other places, but evidence is as yet admittedly very weak.

While St. David's, Canterbury, and Santiago are culture-entries from the sea, in the case of Russia we have one sacred city which, appropriately enough, is a culture entry from the land and the rivers, and that is Kief. It is on the great Dnieper, not far from the south-west border of the forest lands of Muscovy, and it may be said to be the great entrance gate for Byzantine influences from the south affecting Russian religion and art. It is also important in connection with ways from the west, for on its north-western flank begin almost immediately the immense marshes of the Pripet that so greatly hinder contacts between Russia and Central Europe. To get through to Muscovy one must either go north via Vilna and across the Beresina, as did Napoleon, or turn south and so pass Kief on the way into Muscovy. To a certain extent, Sian (Hsinganfu) and Peking are analogous as land entries into China, while ancient Taxila at the foot of the north-western passes played a somewhat analogous part for a while in India.

More in analogy with Mecca than with these other cities is the case of Lhassa in Thibet, the sacred city of Lamaism, the important station on the difficult caravan route from Kashmir into western and north-western China, and many of the caravan routes of East Central Asia have lamaseries as their vital centres. It is worth noting that the Grand Lama of Thibet has claimed a monopoly of gold, an important indication of the association of religion and commerce which we have noted as intertwined in so many other cases.

But to return to Russia, it is significant that the sanctity of Kief has been rivalled, not to say outpassed by that of Moscow, and here we touch upon other factors. The Russian villager has been wont to think of himself as a colonist fighting the great forest and its isolation, and, just as the place names chosen by the Pilgrim Fathers tell of their attachment to the homeland they had left for conscience' sake and knew they would not see again, so the Russian villagers tell of attachment to their tradition by venturing journeys back to its centre, which for most of them is still attainable, albeit at considerable cost. The religous interests of the Russian villager doubtless have other contributory factors, but the attitude of the people of the outposts towards their central home is an important element in the situation. The development of sects, so characteristic of Russian life, is a counter-effect easy to understand.

Moscow, with its remarkable situation relatively to waterways and landways, has thus become a focus of popular feeling in Russia, and it is significant that the change from the Tsarist to the Bolshevist government has been marked by the shifting of the main centre from Petrograd to Moscow.

Benares is, in part somewhat analogously, a centre of Indian popular tradition. Indo-Aryan tradition from the bare lands in the North-west became Aryo-Dravidian as it reached the wealth of the warm forest lands of the Ganges, and the blend spread through the forests of Central India into the Dravidian and pre-Dravidian South, associated more with the religious teaching which helped to make the blends than with the power of the sword which had its base rather in the North-west. This is but a mention in passing of a few points connected with Benares; to go seriously into the matter of the holy places of the Monsoon lands it would be necessary to work out many human contrasts between those lands and our quadrant of the world.

Perhaps of all places which have become in a real and vital fashion the outward and visible centres of widespread tradition none is more characteristic than Rome, for, whereas Moscow fulfilled this function almost solely for people of Slavonic speech, Rome has attracted peoples of many tongues. It is a commonplace to state that her Empire made Rome the centre of the then known world; it is well to remember that this carried with it the bringing to Rome of all manner of cults from Africa, Egypt, and Greece, so that she gathered the fragments of old religions and came to express many religious desires for many peoples. The Empire was always ready to welcome another religion provided it could be practised alongside of its predecessors. Christianity with its many Iranian links, as Strzygowski has been showing, was incongruous with the others and stood outside the circle for a while. But the establishment of the new capital at Constantinople, where Iranian and Anatolian influences most easily entered Roman Europe, helped to capture the Roman world for Christianity, or, perhaps, rather to capture Christianity as a support for the Roman tradition in its perplexed late-Imperial phase. The fall of the Empire and the nominal Christianisation of the barbarian conquerors both played their parts in turning men's thoughts to Rome. In the Dark Ages men recalled memories of the peace and law of Rome and sought the advice of the churchmen, now the only repositories of remnants of the ancient learning. When the light began to return in the Middle Ages the prestige of Rome was enormous, and long remained so. Rome as centre of law and peace, of learning and guidance, in the minds of the harassed men of the Dark Ages, seems to be a vital factor of the sanctity it acquired and, unfortunately, valued too little.

But, if Rome grew as a memory, may we not say the same, in still larger measure, of the most holy of all holy cities, Jerusalem, treasured by Jews, Christians, and Muhammadans alike? In so important a matter there must be many factors. It is evident from the reference to Melchisedek in Genesis that the priest-king of Jerusalem had a special position, he ruled the fortress at the side of the trade routes, whether that from Hebron to Bethel and Shechem, or that branch from the Bethel road which led to

Jericho and so across Jordan, or that along the western side of the Dead Sea. Later, it was to Moriah that Abram was sent to offer up his son. In the Israelite conquest of Canaan again it is evident that the hostility of Jerusalem was a serious factor finally removed only long afterwards by the victory of David, who thereupon forthwith becomes concerned about building a Temple. Obviously then, Jerusalem, from very early times, had associations which would help us to understand its later history did we but know more. Yet these long associations furnish only the groundwork of the wonderful edifice that grew in men's minds. When the Jews were in exile, Jerusalem became idealised as the home of their beloved tradition, as the sign and mark of everything that kept them from sinking their individuality among the Gentiles. But just as they were at the stage for getting beyond a tangible to an abstract God, so also their minds passed from the actual city of Jerusalem to the idea of the city not builded with hands. At a later period, as Ramsay has so well shown, the Jewish colonists in Galilee treasured the thought of Jerusalem, and went as pilgrims to the Holy City, as one sees from the story of Jesus. With the fall of the City it became a memory to Jews in exile, to Christians persecuted, and later in power; to rulers who used that memory to work up popular feeling in favour of capturing what still is a key to control of trade routes important now as in the days of Abram four thousand years ago. But this political and commercial interest is altogether outclassed by the spiritual one which has made the old memories of Jerusalem the basis of the ideal of drawing all men into brotherhood and of realising the ideal on earth. It is the theme of poets, painters and prophets, and is to be understood of all, just as among the factors of its sanctity we think we can trace almost, perhaps all, the factors which have operated to sanctify its lesser sisters the world over.

A place may thus become holy through the working of many and diverse factors affecting both material and spiritual interests, but it seems fair to say that the persistence of an association between men and some one place depends on its making an appeal to their more inward and spiritual side. In many cases the holy place gained its reputation largely through being, for one reason or another, a centre of intercourse identified with a particular cultural tradition, but there may be cases of sanctity of durable type gathering around a lonely spot and transforming it into a centre of intercourse. Alleged cases of this hitherto have usually become suspect when investigations have been made. The idealisation of the holy place is an universal feature, so that the actual place is less and less considered, and its name comes to stand for such dreams as, for example, that of the new Jerusalem.

H.J.F.

And did those feet in ancient time
Walk upon England's mountains green?
And was the holy Lamb of God
On England's pleasant pastures seen?

And did the Countenance Divine
Shine forth upon our clouded hills?
And was Jerusalem builded here
Among these dark Satanic mills?

Bring me my bow of burning gold!
Bring me my arrows of desire!
Bring me my spear: O clouds, unfold!
Bring me my chariot of fire!

I will not cease from mental fight,
Nor shall my sword sleep in my hand,
Till we have built Jerusalem
In England's green and pleasant land.

W. Blake.

NOTES FOR A LESSON ON THE SIGNIFICANCE OF HOLLAND.

By STEPHEN S. VISHER, Ph.D. (Chicago), Indiana State University,
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NETHERLANDS has a population, a commerce, an international prominence, and an historical significance far greater than its small size would suggest. It makes up only one-three-hundredth of the area of Europe, or about one-five-thousandth of that of the lands of the globe. Yet it has about one-sixtieth of Europe's people, and nearly one-two-hundredth of the world's population, or approximately twenty-five times its proportional share. In respect to commerce, it has about one-twenty-fifth of Europe's total and about one-fiftieth of the world's total. In regard to international prominence, Netherlands is numbered among the world's ten leading nations ; it has important colonies ; in its cities many international tribunals and congresses convene, and the deliberations of Dutch statesmen and the reports of Dutch scientists are given respectful consideration by the leaders of other nations. Historically, Holland has played an important role for centuries, and has made many more than its expected share of contributions to civilization—discoveries, inventions, works of art, improvements in law, etc.

Table I. gives recent statistics as to area, population, and commerce of Holland, and also of Belgium, for comparison.

TABLE I.

	Area	Population	Per Sq. Ml.	Imports	Commerce Exports	Per Capita
Holland	13,200 sq. ml.	6,779,000	514	1,136 mil.	567 mil.	251
Belgium	11,373 sq. ml.	7,685,000	673	612 mil.	903 mil.	197

ADVANTAGEOUS LOCATION.

What are the geographic bases for the prominence of this tiny area? In the first place, it is very favourably located for commerce. To the north, close at hand, is the most thronged portion of all the oceans, the English Channel and the North Sea. The great importance of the ocean to Netherlands is suggested by the fact that two of the world's greatest eight seaports are here—Rotterdam and Amsterdam. Crossing the area, is the world's most used inland waterway, the Rhine. The area itself is a part of the north European plain, along which extend many railroads. The countries near Holland include all but a very few of the world's progressive nations. To the west lies England, to the south, Belgium, and not far away, the industrial portion of France, to the east is Germany, and to the north, readily accessible by water, is prosperous Scandinavia. Because of this location, Holland is crossed by a large fraction of the commerce between Central Europe and the North Sea, and between Germany and France. Its intimacy of contact with other nations has tended to emphasize the need for international understandings. Indeed, a Hollander, Grotius, is called " the Father of International Law."

Note.—The author studied in Holland during the summer and autumn of 1920, while on a semester's leave of absence from Indiana University, where he teaches geography.

ADVANTAGES OF LEVELNESS.

A second great advantage possessed by Holland is the level land. This facilitates agriculture, road making, canal digging, transportation of all kinds, and the construction of buildings as well. Holland is a leader in respect to the development of transportation. The service between Rotterdam and Amsterdam is perhaps unexcelled. Splendid trains run every 15 minutes or so throughout the day, and the rates are low, and wrecks almost unknown. In addition to possessing one hundred and sixty miles of railroad per thousand square miles of area, Holland has numerous canals and natural waterways. Indeed a large share of the internal commerce is carried by water.

The relatively level land facilitates agriculture in many ways. On level land there is a tendency for the soil to be deep, little subject to erosion, and less readily leached than in rougher lands. Artificial fertilization has helped to make the better soils remarkably productive, and careful cultivation results in large yields. Netherlands is exceeded only by Belgium among all the nations in the average yield per acre of several crops. Table 2 gives the average yield per acre in recent years of six crops in Holland and the United States. The yield for Belgium is also shown, for comparison. It will be noticed that the American yield averages only about half that obtained in Holland.

TABLE 2. YIELD PER ACRE OF CHIEF CROPS.

Crop	Holland	Belgium	United States
Potatoes ...	253 bu.	280 bu.	102 bu.
Sugar beets ...	2 tons.	2¼ tons.	1½ tons.
Wheat ...	36 bu.	39 bu.	14.7 bu.
Oats	51 bu.	63 bu.	30 bu.
Barley ...	50 bu.	51 bu.	25 bu.
Rye	28 bu.	34 bu.	18 bu.

Although farming is carried on so intensively, the proportion of the population engaged in commerce or specialized agriculture is so large that much food is imported. Indeed one of the chief imports is food. Holland has large areas less favourable for tillage than for grazing. In fact, only one-fourth of the land is in crops. Much of the land below sea level is too wet to grow most crops, but luxuriant grasses thrive. Furthermore, a large share of Northern Holland is too sandy for profitable tillage, and hence it is kept in grass. Under these conditions, the production of live stock is intensive. Sheep and goats are reared in large numbers, chiefly in the more sandy northern provinces, but Holland's rank is especially high in respect to horses, cattle, and swine, as is shown by Table 3.

TABLE 3. NUMBER OF HORSES, CATTLE, AND SWINE PER SQUARE MILE, TOGETHER WITH THE RANK OF THE COUNTRY, AS COMPARED WITH OTHER NATIONS.

	Horses		Cattle		Swine	
	No.	**Rank**	No.	Rank	No.	**Rank**
Netherlands ...	26	II.	165	I.	106	IV.
Belgium ...	23	III.	160	II.	124	II.

Nearly one-half of Holland is, at high tide, level with or below sea level. Much land near the Zuyder Zee has been reclaimed. Great dykes are built around an area of swampy land, and then the water is pumped, partly by windmills, from off the land into the sea. The Netherlands is chiefly a low plain, being a continuation of the plain of Northern Belgium and Western Germany. Much of the area is part of the Rhine delta also.

The sandy coastal strip and the wet, low-lying areas produce a heavy growth of grass, and dairying is the chief industry. Indeed, a chief export is dairy products, especially cheese. Holland is also noted for its gardens. Flower gardens occupy more than one hundred and twenty thousand acres, and Dutch tulips are famous the world over. Holland is a commercial and agricultural nation rather than an industrial nation. The almost complete lack of coal, of water power, and of all minerals but clays and sand, have put her under too heavy a handicap for successful competition with better endowed nations in general manufacturing, and hence little manufacturing for exports is carried on, except of high-class pottery, cheese, and the preparation of various tropical products, such as cocoa, for the market. Diamond cutting is also important.

CLIMATIC ADVANTAGES.

A fourth great asset is the stimulating climate. The climate is cool enough to favour intellectual activity, but not so cold as to be numbing, nor are the extremes great enough to be very harmful. However, there are frequent changes of weather from day to day, produced by the passage of cyclonic disturbances. The indications are that such changes of weather are distinctly stimulating, and hence that countries which have many not too severe changes should count them as great assets. Ellsworth Huntington has presented evidence on this matter in "Climate and Civilization" (1915) and in "World Power and Evolution" (1918). The Dutch climate is favourable to dairying, too, because of its coolness and humidity. Four days out of each week, on the average, are classed as rainy. Such a rainfall régime is far more favourable to the growth of rank grasses than of most crops. Northern Holland is the home of a famous dairy breed of black and white cattle, notable for the large quantities of milk given. Their abundant yield of rather thin milk is doubtless related to the large water content of the marsh grasses of Holland. The cows are also large, with huge abdomens. The frequency of rainfall, the relatively slow evaporation, and the commonly poor drainage have combined to encourage cleanliness on the part of housewives. Carelessness in this respect is more costly in Holland than in most lands.

FORMER ADVANTAGES OF SMALL SIZE.

Certain advantages have been derived in the past from small size. It helped early development, for as Ratzel has pointed out, precocious development is as characteristic of small areas as retarded development is of large areas. Holland has been one of the important commercial nations of the world since the 16th century. The Dutch began their career on the sea as fishermen, and fishing continues to be a great industry. In the 16th century they became distributors for Oriental products from India, etc., brought to Lisbon by the Portuguese. Soon they undertook trips around Africa in order to get the Oriental merchandise themselves. This early commercial development helped the Dutch to secure choice colonies in various parts of the world, especially in the East Indies. Skilful management has enabled Holland to carry on a large amount of commerce with these colonies ; three-fourths of their total export goes to the Netherlands. This early start also aided in the building up of a profitable business of carrying the commerce of other nations. To-day the Dutch have a large fleet of merchant ships carrying on commerce in all parts of the globe. At present they are surpassed in per capita tonnage only by Norway and the United Kingdom (the tonnage for Norway being .8 ; United Kingdom .4 ; and the Netherlands .3 tons per capita). Holland ranks seventh among the nations of the world in total gross tonnage.

The small area of land available and the early attainment to a relatively high standard of living are probably partly the basis for the fact that the Dutch were the teachers of the world in respect to certain aspects of navigation, draining, and of government. Several inventions and discoveries were made there probably because the need for them was felt there earlier than in the then less crowded advanced nations. The art of dyking and draining by pumping is one. The Dutch are also accredited with having been important contributors in respect to insurance, banking, and the financing of enterprises by the sale of stocks and bonds.

Handicaps of Small Size.

In spite of all these advantages, the future of Holland seemingly is not very bright. It is too small ; the population is cramped. Other nations with larger areas and greater resources have a great advantage. Another unfortunate result of the smallness of area is that there is little sectional diversity in crops. Hence adverse weather conditions usually are nationwide, and the resulting crop failure is a national calamity instead of a sectional one, as in larger nations. Most important of all, perhaps, is the fact that a small nation tends to approach the limit of its resources earlier than does a large nation. Hence expansion and rapid progress is stopped sooner. The glory of Holland already probably lies in the past. From the standpoint of the youth of to-day, this fact is a great handicap, for optimism as to the future is almost necessary for success. Hence it is no wonder that many Dutch have emigrated to lands where the future is still rosy.

[Note.—The author's Dutch connections and his modesty have prevented him from bringing out one of the remarkable points of significance of Holland, but an editor without Dutch links is free to draw attention to it. During the Middle Ages a number of factors, including the geographical one of poverty of location, helped Holland towards toleration, and so brought to her refugees, Gentile and Jew, from other lands which were killing and exiling their choicest citizens in the name of religion. It is in no small measure because of this fact, linked with the fact of development of world-wide commerce by the Dutch seamen, that Holland has played such a leading part in the worlds of thought and art. One could name scholars, philosophers, jurists, craftsmen of the Renaissance, Rembrandt and many another artist, and, in our own day, some of the scientific workers who have contributed most to the development of astronomical, chemical, and biological research. In many cases it is true they found their opportunity in some other land, but Holland was, and apparently is likely to remain, a seed-bed of genius for the world.— Ed.]

Two articles, at least, in the Law Quarterly Review will be found interesting by some geographers. H. J. Randall writes on Nationality and Naturalization, and states the almost insoluble difficulties of any scheme of world-law on the subject. His reflections on nationalisms as movements of the middle of the nineteenth century and on the difference between the criterion of place of birth adopted by Britain and that of parentage adopted on the European continent, suggest many thoughts about problems of internationalism that geographers need to meditate. Professor Lee (Oxford) writes on Roman Dutch Law and its utilization in South Africa, where, under the unified conditions prevailing since the 1906 settlement, a tradition is growing up through the blending of Roman Dutch Law and English Common Law. A few notes on the Roman Dutch Law of Holland leave the reader asking for more.

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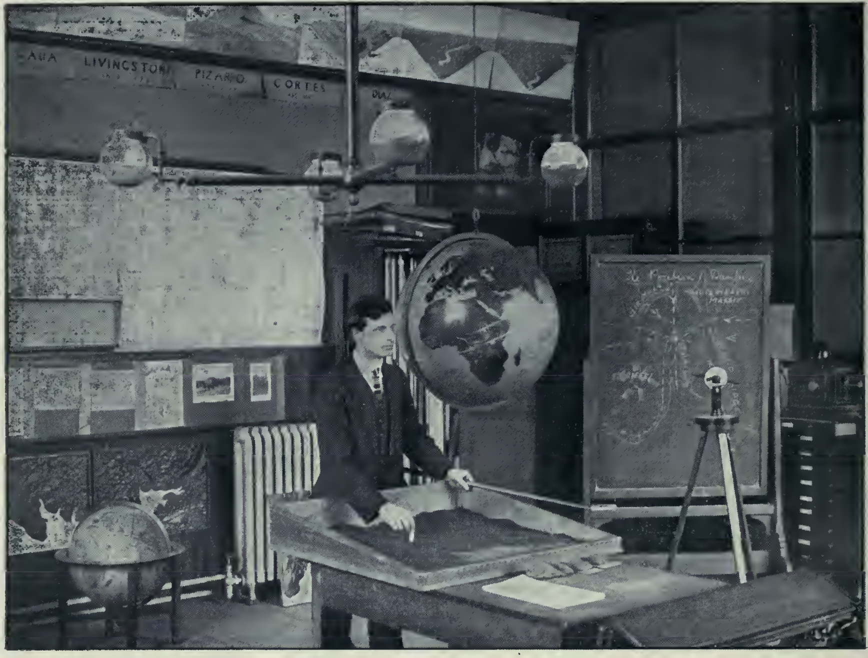


A GEOGRAPHY CLASS ROOM.

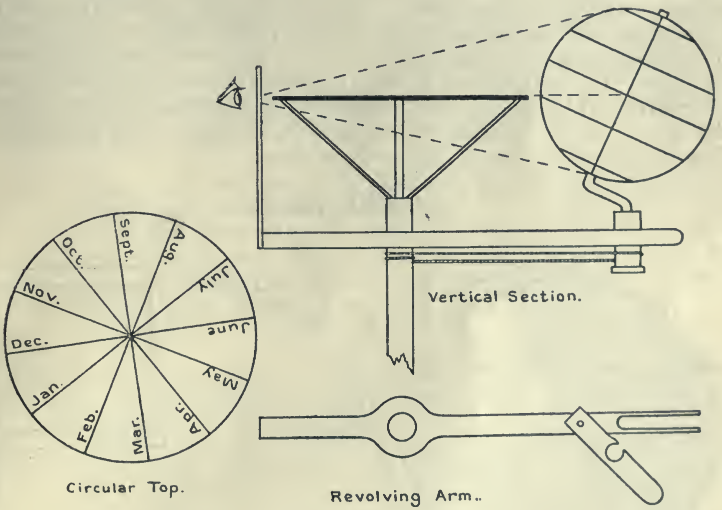
AS we are frequently asked about types of geography classroom, we publish the above photograph of a geography classroom in a primary school in South-West Scotland. It will be noted that the table can be removed, and so leave a sufficiently wide floor space for maps to be placed horizontally and orientated, the class being arranged round the map. The equipment includes a map cupboard from which maps can be suspended on slides fitted with hooks, a nest of drawers for storing regional illustrations, a sand tray with open front, a lantern, a relief globe, and a suspended globe with the continental surfaces covered with blackboard preparation, so that it can be used for varied lessons. The scholars, in conjunction with their art teacher, have designed and printed or painted the dado of type scenery, and the names of explorers, and have mounted the pictures on the wall. A relief model of the neighbourhood with much exaggerated slopes, and another with actual slopes have been made, and in addition to various hand coloured O.S. maps, the class possesses an old map of the town presented by one of the scholars. In No. 34 of the "Geographical Teacher," which may be obtained from the Clerk, Geographical Association, Marine Terrace, Aberystwyth, price 7d. post free, there are notes and illustrations of geography classrooms and their essential equipment.

A TEACHING NOTE ON THE APPARENT MOVEMENT OF THE SUN.

A. W. Dissanaike, Galle, Ceylon.

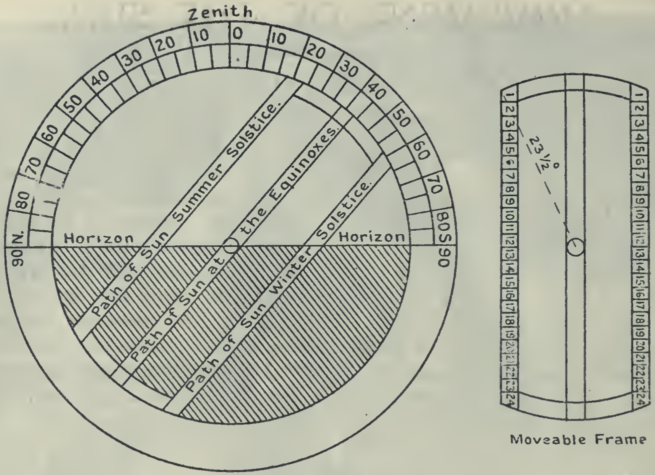
IN lands near the equator the varying length of day and night and the difference in the noon altitude of the sun are hardly noticed, so slight is the difference in the conditions of summer and winter. The geography teacher is faced with a difficult task. Take the conditions at the Poles or the Polar Circles. A pupil has to summon all his powers of imagination to his aid to grasp fully the fact that the sun circles overhead for six months at the poles, or that one day in the year the sun does not set at the Polar Circles. The path of the sun in the sky at other latitudes too is hard to understand. It is clear then that models which visualise these conditions are an absolute necessity, as these stimulate the imagination of the pupil and lighten the task of the teacher. A few such models are here described, in the hope that they will be found useful.

MODEL No. 1.



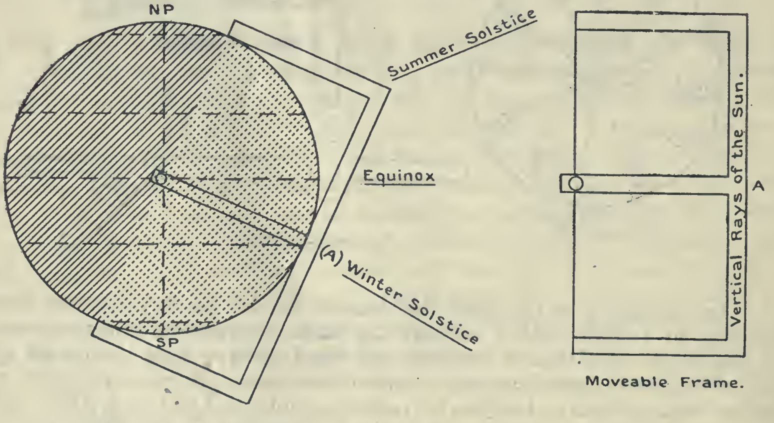
An apparatus to illustrate the rotation of the Earth round the Sun. It consists of a stand with a circular top made of wood or other material $\frac{1}{8}$in. to $\frac{1}{4}$in. thick (the thinner the material the better). This is divided up into 12 parts, one division for each month of the year. A revolving arm is fixed below this, at such a height that when a globe is fixed to it the equator is on a level with this plane. A sight is attached to the other end of the revolving arm. By a pulley or string arrangement the globe can be made to revolve with its axis always pointing in one direction. The sight when brought against the name of any month shows the position of the sun with relation to the earth during that month.

MODEL No. 2.



On a board draw a circle 9in. radius and colour it black. This represents the earth. Draw red lines to show the position of the equator, tropics, and the polar circles. Make a rectangular frame 18in. x 9in., and cover it with transparent paper, white or yellow. This represents the vertical rays of the Sun. Fix this frame to the centre of the circle so that it could be easily moved. The model then illustrates the swinging of the vertical rays of the Sun north and south of the equator, and the varying length of day and night throughout the world at all Seasons.

MODEL No. 3.



To illustrate
1. Varying length of day and night.
2. Noon altitude of the Sun.
3. Direction of Sunrise and Sunset.
4. Path of Sun in the sky.
at any latitude.

Draw a circle of 9in. radius: colour half white and half black. The line between the two colours represents the horizon. The upper arc represents the sky and daylight, the lower arc the earth and night. Divide the upper arc into 180 divisions with zenith and number off right and left about from zenith. Mark the right side South and the left North. Make a wooden or tin frame as per illustration. The frame is a part of an equal circle each side 23½° away from the centre. Fix this frame to the centre of the circle.

How to use it: Adjust the frame with the line indicating "Path of Sun at Equinox" the same number of degrees N. or S. of the Zenith as the latitude of the place is South or North of the Equator.

A PRACTICAL GEOGRAPHY PAPER.

THE subjoined paper in Practical Geography has been sent to the Editor, who thinks that it represents an interesting experiment. It was an attempt to balance varying aspects and to give full credit to the draughtsman (Ques. 1), the arithmetician (Ques. 5), the historian (Ques. 3), and the analytical and synthetical map student (Ques. 3 and 4). It was based on a specially issued portion of the East Kent Sheet of the 1″ O.S., and extended from Deal to Dover, and included the Roman Road Dover to Eastry. It was a paper in a University Degree Examination.

(1) X and Y are two points such that the bearing from X to .405 on main road near Duke of York's R.M.S. (D2) is 214° and from Y to the same point is 135½°. The bearing from X to .243 on road over Sutton Downs (C2) is 283° and from Y to the same point is 40°. The bearing from X to Y is 249°. (The vertical lines on the map can be used as meridians). Are X and Y intervisible?

(2) Discuss very briefly the relation of the (1) early, (2) mediæval, (3) modern lines of communication to the topography as represented on the given map.

(3) Describe the modern use in cartography of the following:—contour lines, equipluves, isallobars, isanomalous lines, isotherms.

(4) Summarise the chief contributions to geography, with special reference to cartography, of any five of the following:—The Blaeus, Eratosthenes, Mercator, Ordnance Survey—recent officials, Ortelius, Pomponius Mela, Ptolemy Claudius, Romans generally, Saxton, Strabo.

(5) Calculate and draw the element 30°W to 30°E and equator to 60°N on each of the equatorial cylindrical "projections." Network at 30° interval. Scale 1 in 100 millions. Comment on the value of each "projection" for cartographical purposes. Mercator's meridional parts in minutes of equatorial circle:— $0°-30°=1876.7$; $0°-60°=4507.1$.

PERMANENT COMMITTEE ON GEOGRAPHICAL NAMES FOR BRITISH OFFICIAL USE.

OWING to the inconvenience caused by the great variety of ways in which foreign place-names have been spelt in the past by British writers and cartographers, the Permanent Committee on Geographical Names was formed in April, 1919, at the request of the Admiralty, in order to examine cases of doubtful geographical nomenclature and spelling, and to prepare authoritative lists of names, as required, for British official use, thus setting up a standardised spelling of place-names which might be gradually adopted by the Press, the Map-makers, and the Public generally.

The Committee consists of representatives of the Admiralty (2), War Office (2), Foreign Office (2), India Office, Colonial Office, Board of Trade, Ministry of Agriculture (Ordnance Survey Office), Post Office, Royal Geographical Society (5), and Royal Scottish Geographical Society, under the Chairmanship of one of the Members of Council (at present a Vice-President) of the Royal Geographical Society. It meets several times a year to consider and approve lists of place-names prepared for publication and to deal with any questions that may be referred to it. In the preparation of the lists care is taken to obtain the opinion of the best authorities available, and no lists relating to any portion of the British Empire are published until they have been submitted to, and approved by, the local government concerned. The five overseas Dominions have permanent representatives on the Committee, to whom any matters concerning the Dominions are referred, and the Government of the Irish Free State has recently been invited to appoint a representative.

The headquarters of the Committee are at the house of the Royal Geographical Society, from which, however, it is a distinct body with entirely separate staff and financial arrangements. Since the cessation of the small Treasury grant in 1922, the expenditure has been met entirely (*a*) by voluntary subscriptions sent in response to an appeal by the President R.G.S. first to scientific societies, commercial firms and other interested bodies, and later to individual Fellows R.G.S., and (*b*) by the sale of the publications.

It is hoped that any person interested in this important work, whether or not desirous of obtaining copies of the lists of place-names, will become a subscriber (annual, if possible) at least to the extent of 5s.; but larger subscriptions will be gratefully received, especially from Societies, Public Bodies, etc. Subscriptions should be sent and cheques made payable to the Secretary, Permanent Committee on Geographical Names, at the Royal Geographical Society, Kensington Gore, London, S.W.7; or forms for sending standing orders to bankers will be supplied by him on application. All subscribers, unless they intimate otherwise, receive copies of new lists of place-names once a year, or, if they specially desire it, immediately on publication. The lists may be purchased separately, price 6d. each, and the Rules for the Spelling of Geographical Names for British Official Use (termed the R.G.S. II. System) may be obtained gratis either from the Secretary P.C.G.N., or from Edward Stanford, Ltd., 12, Long Acre, London, W.C.2; Sifton, Praed and Co., Ltd., 67, St. James' Street, London, S.W.1; or George Philip and Son, Ltd., 32, Fleet Street, London, E.C. 4.

The following Lists, embracing about 3,700 names, have been published up to date; of these those marked [1], [2], [3], [4] were issued to Fellows R.G.S.

with the *Geographical Journal* for April 1921, July 1921, January 1922, and February 1922 respectively, after which it was found impracticable to continue a free distribution :—

First General List of European Names[1]	about 275
Second General List of European Names	200
First General List of Asiatic Names[2]	175
Second General List of Asiatic Names	275
First General List of African Names[3]	250
First General List of Oceanic Names (Foreign Dependencies)	300
Second and Third General Lists of Oceanic Names (Australian and New Zealand Dependencies)	225
First General List of Names in the Empire of India	600
First List of Names in Iraq (Mesopotamia)	300
First List of Names in Tanganyika Territory[4]	500
First List of Names in Gold Coast and British Togo	225
First List of Names in Czechoslovakia (Bohemia only)	375

The following are in the press :—

First List of Names in Palestine.
First List of Names in Nigeria and British Cameroons.
First List of Names in Fiji.

In addition, a pamphlet has been published (R.G.S. Technical Series No. 2) entitled "Alphabets of Foreign Languages transcribed into English according to the R.G.S. II. System," by means of which the pronunciation of all the important European and several Middle Eastern languages (some fifty in all) can be ascertained. This was issued by the Royal Geographical Society, which bore the considerable cost of its publication. It may be purchased, price 7s. 6d., at the office of the R.G.S. (to Fellows R.G.S., price 6s.), or from the agents mentioned above.

EDWARD GLEICHEN, Maj.-Gen.,
Chairman, P.C.G.N.

JOHN H. REYNOLDS,
Secretary, P.C.G.N.

Royal Geographical Society,
Kensington Gore,
London, S.W. 7.
July, 1924

Wonders of the Himalaya. Sir F. Younghusband. 22½ x 14½ cm., 210 pp. John Murray, 1924. 10/6.

The distinguished author tells us that having written a book on religion the theologians warned him off the subject, and he has turned his attention to a book for men and women on his wonderful journeys, and a book he hopes boys may read. While we think that the theologians made a mistake, not their first, many people will welcome the consequence, for in this book we learn of the interests and intercourse which have made the author one of the more thoughtful and considerate of the representatives of western life in its difficult contacts with the east. He tells of a journey from Turkland down to India, not even by the Karakoram pass, formidable enough, but by the Mustagh into Kashmir, with thrilling adventures on icy precipices. He met Russians, and was helped by men of varied colour and tradition, and talks of the Pamirs and of wild Hunza with a thoughtfulness and a vital appreciation of the glories of nature that will charm the reader and leave a choice memory in his mind. We know all too little of the regions between the Indus and Turkestan, though Britain has such responsibilities on its borders and it is so full of memories of the old days of commerce when the silk of China was spreading to the west. There are few regions that so much need attention from teachers of geography, and this book will be found an attractive introduction to further study in the works of von Richtofen, the stories of Buddhist pilgrims, Sven Hedin, and Aurel Stein.

RECENT ARTICLES OF GEOGRAPHICAL INTEREST.

R. A. PELHAM, University College, Aberystwyth.

THIS list continues from list in Geographical Teacher, Vol. XII, pages 397—401 (Summer, 1924). It covers the following publications:—GJ—Geographical Journal, May-Aug., 1924. SGM—Scottish Geographical Magazine, May-July, 1924. AGR—American Geographical Review, July, 1924. J of G—Journal of Geography, May, 1924. A de G—Annales de Géographie, March, 1924. Z—Zeitschrift der Gesellschaft für Erdkunde, Berlin, 1924, Nos. 3-4. PM—Petermann's Mitteilungen, 1924, Nos. 1-2, 3-4, 7-8.

EUROPE.—H. A. Matthews, SGM, May, 1924. Comparison between the Mediterranean climates of Eurasia and America (emphasizing the sea's influence in modifying climate).—J. Mathieson, SGM, July, 1924. General Wade and his military roads in the Highlands of Scotland (historical—maps and illust.).—H. J. Fleure, AGR, July, 1924. Cities of the Po Basin; an introductory study (largely historical, showing Mediterranean and Central European influences on architecture—economic activities—maps and illust). —J. Dumontet, A de G, March, 1924. Displacement of agriculture by cattle rearing around Bayeux—particulars of occupations.—L. Bochet, A de G, March, 1924. Backward state of agriculture in Upper Saone Valley—occupations and population statistics.—C. Robert Muller and R. Capot-Rey, A de G, March, 1924. Social and economic conditions in the department of Sarre.—F. Machatschek, Z, 1924, Nos. 3-4. Political and some economic geography of Czecho-Slovakia.—H. Hassinger, Z, 1924, Nos. 3-4. Important survey of recent publications on anthropogeography of Switzerland.—H. Mortensen, Z, 1924, Nos. 3-4. Short account of present and prehistoric distributions of forest and settlement in S.E. Baltic lands.—N.Malinin, PM, 1924, Nos. 1-2. Secular changes of magnetic influences in N. Russia 1880-1920—3 maps.—F. Leyden, PM, 1924, Nos. 7-8. Coloured plans of eleven Flemish cities—origins, etc.

ASIA.—GJ, June, 1924. The Mt. Everest Expedition (misfortunes of 1924 party).—W. H. King, GJ, June, 1924. The Telegraph to Lhasa (from Gyantse—description of project and Tibetan interest in same—illust).—GJ, July, 1924. The Mt. Everest Expedition (tragic end of third expedition —summary of events).—Sir C. Pereira, GJ, Aug., 1924. Peking to Lhasa (emphasizing difficulties of travel and transport—map and illust).—GJ, Aug., 1924. The Mt. Everest dispatches (detailed account of 1924 expedition—photographs of party and mountain).—J. L. Myres, SGM, May, 1924. The Marmara Region: a study in historical geography (strategic importance of region as focus of land and sea routes).—C. F. Jones, J of G, May, 1924. Tea in Assam, India (details of production and trade figures).—H. Haack, PM, 1924, Nos. 1-2. Part III of discussion on sources of material for Asia in connection with Stieler's "Handatlas" (1824-1924).—R. Pohle, PM, 1924, Nos. 3-4. Frozen soil (depth, etc.) in N. Asia and Europe.—A. Schultz, PM, 1924, Nos. 7-8. Morphology and climate, past and present, of high desert regions in Central Asia.

AMERICA.—S. C. Bullock, GJ, May, 1924. Tocantins and Araguaya Rivers, Brazil (general description of region traversed; illust).—A. P. Brigham, GJ, May, 1924. American dependence on foreign products.—F. H. Kitto, GJ, May, 1924. The survival of the American Bison in Canada

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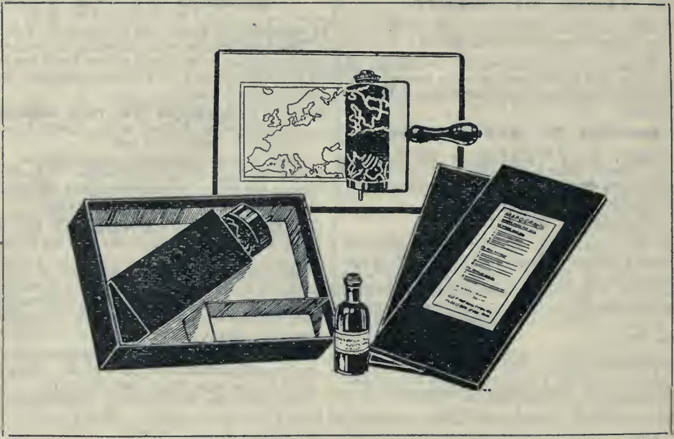

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Foundations of Agricultural Economics. J. A. Venn. 23 x 15 cms, 397 pp. Cambridge Univ. Press, 1923. 16/- net.

This book is not an exhaustive treatise on agricultural economics, but it deals in turn, historically and critically, with the various economic problems which touch the life of the agricultural community. It claims to be written for the general public rather than for the advanced research student, and, in addition to the information to be obtained from it, its freshness of style and freedom from technicalities of terminology make it very acceptable to the average reader, to whom it should supply much food for meditation.

It embodies a considerable amount of original work in such subjects as vicarial tithes, agricultural statistics from 1830-1860, and the ploughing campaign of 1917-1919. The first-named forms a particularly interesting section. References are made to tithe in the ancient civilisations of Babylon, Egypt, Greece, and China. Its development and incidence are traced through the Middle Ages and the period of the introduction of new crops in the 16th century up to modern times, with their legislation relating to commutation of tithe in 1836 and redemption of tithe in 1918.

Emphasis is laid by the author on the need of statistics relating to rural economy, concerning which there has been so much apathy and opposition in the past. Throughout the book arguments are supported by statistical tables, maps and diagrams, and there is a full Appendix giving tables of the acreage and yield of important crops, as well as a series of maps showing the yield per acre of wheat, barley and oats, respectively, during three successive decades in each county of England and Wales. These last are published for the first time.

The author estimates sympathetically the conditions of the agricultural labourer, whom he ranks high as a skilled worker. He strikes a truer note than some social reformers in urging not urbanisation of the country, but better transport facilities as a means of restoring rural economics. This surely goes hardly deep enough; it is the spirit of industrialism that is the root evil of the case.

The book deals more especially with conditions in Great Britain, but reference is made throughout to agricultural practices in other countries, and comparisons and contrasts are worked out. Amongst other factors making for success in Danish co-operation, the author finds the most important one to be the fact that "virtually the whole trade is an export one." Probably neither in this nor in their system of land tenure, nor in the nature of their products, do we find the real cause. It might be found, perhaps, in the habit of co-operation inculcated—largely unconsciously—in the growing boys and girls of Denmark in the winter schools organised by the far-seeing Bishop Grundvig during the time of Denmark's deepest depression. S.H.

"Time and Weather by Wireless." Wireless Press, 1923. 3/6.

Our readers will be interested to know that Mr. Mitchell, who read the paper on "Local Forecast Centres in Secondary Schools" at the January Conference on Meteorology in Education, has written this attractive little book.

The National Home Reading Magazine is publishing a series of articles on "What is Geography?" beginning on October 1st, 1924.

GEOGRAPHY IN SECONDARY SCHOOLS.

AN attempt is being made by the Geographical Association to inaugurate a file which shall indicate the position of geography in secondary schools for each year. Mr Jas. A. Butterfield, 102, Shipley Fields Road, Frizinghall, Bradford, kindly undertook to collect and report on the data sent in this year. It will be seen that the response to the request for information has not been at all general, but we hope that in 1925 teachers of geography in secondary schools will respond more generally, and thus make the list more complete next year. Mr Butterfield's 1924 report is appended.

In the Spring, 1924, number of the Geographical Teacher a request was made by the Association for information which would lead to the compilation of a census of all secondary school in which scholars are presented for examination in geography at the first or second public examinations. Five main points were asked for, viz. : (1) Name of school ; (2) Public examination taken ; (3) Number of scholars taking first and second examinations ; (4) Board of Education Regulations under which geography is recognised in the school ; and (5) Names of geography teachers. This information was asked for on a postcard for filing, and a subsequent similar request was made in the Summer number. The response has been very disappointing, and it has been thought advisable to give at present only a rough analysis of the information received and to make a further appeal next year. The replies received up to the present are all filed in the office of the Association.

Fifty-eight replies have been received, distributed as follows :—Birmingham (2), Bishop Auckland, Blackpool, Bradford (2), Bridgwater, Bridlington, Brighouse, Bristol, Castleford, Cirencester, Darlington, Dartford, Derby, Dewsbury, Durham (2), Falmouth, Harrow, Hull, Ilkeston, Ilminster, Leeds (5), Leicester (2), London (9), Loughborough, Mirfield, Oxford, Pontefract, Reigate, Sandown, Sheffield, Shrewsbury, South Shields, Stockton-on-Tees, Sunderland (3), Wakefield, West Hartlepool (2), Windsor, Worcester, and York. So far as it has been possible to gather, twenty-two of these replies have come from girls' schools, the others from boys' or mixed schools. The fifty-eight schools concerned sent in to the first examination this year 1,905 candidates and to the second examination 153 candidates. We obviously need a far larger response before we can deal with the matter in more detail.

Of the examinations at higher stage taken at the University of London, three schools sent in candidates for the Intermediate Degree, one school alone sending in seven candidates for the London Int. B. Com. The replies to section (iv.) were rather disappointing, probably because the information desired was not made sufficiently clear. Thirty-one schools came definitely under the Board of Education Regulations, twenty-six either did not answer this question or were in doubt, and two were not yet recognised by the Board.

A census of this nature is only of use if it is complete. In the British Isles there must be somewhere between two and three thousand secondary schools. The fact that only 58 replies have been received has made it impossible to give any useful report, and no such thing has therefore been attempted. In the Spring, 1925, number of the Geographical Teacher a leaflet and questionnaire is to be issued which will ask for similar information, probably in a little more detail. It is requested that all geography specialists in secondary schools in the country will make a special effort to fill in the form and return it to the Association. The information when classified, if at all comprehensive, would be of the utmost use, and it might prove advisable to make it a yearly compilation. It can, however, only be done with the whole-hearted co-operation of the members of the Association.

In conclusion, thanks are tendered to all those who have kindly sent in replies up to date.

Ancient Hunters. W. J. Sollas, F.R.S. xxxvi + 697 pp., 22.5 x 14.5 cm. Macmillan and Co., Ltd., 1924. 25/-.

Professor Sollas is one of the real scientific personalities of our time, with a mind ever ready to welcome new ideas and to adjust old views to new truth. He has catholicity of taste to welcome not only the delightful popular exposition of the Old Stone Age by Mr. and Mrs. Quennell, but also the venturesome efforts of H. G. Wells, as well as the fine synthetic work of our President-Elect in the Cambridge Ancient History. The first edition of this classic, for such it is rapidly becoming, appeared in 1911, and one cannot but note how much the study of early man has advanced in the interval, and how closely the author has been connected with critical phases of that advance.

Prof. Sollas originally planned to give a picture of the life of hunters of the Old Stone Age and to amplify it from our knowledge of hunting peoples of our own time, studying them for clues to the interpretation of prehistoric finds. The second edition showed a remarkable development as compared with the first, and the third again goes far beyond the second. In this edition, for example, we find accounts of the finely modelled clay reliefs of animals in the Tuc d'Audonbert, of the " Trois Frères," and of the crude but interesting clay reliefs of the cave at Montespan, all discoveries of the last 12 years. It is characteristic of Prof. Sollas' openness of mind that he explains the change of opinion which has made him think that some eoliths are really tools shaped by an intelligent being in upper Miocene times as well as subsequently. He follows up the work of Lamothe and Deperet, and discusses the four successive Mediterranean shorelines now marked by terraces, which he claims to be contemporary with the four ice-advances of the Alpine region discussed by Penck. He takes up the studies of Tasmanians, Australians, Bushmen, and Eskimo, often making acute suggestions which all point to the interpretation of these peoples as survivors of stages in evolution of human culture, stages represented in Europe by finds of the various phases of the Old Stone Age. He also utilises the work of de Geer, who has reckoned out the numbers of deposits due to annual summer melting of the retreating ice-sheets as they vanished northward in Scandinavia. It will thus be seen that Prof. Sollas makes his book a review of most of the recent efforts to advance knowledge on the geological side as well as in the province of the archæology of tools and the arts. Added to this we get Prof. Sollas' views on finds of ancient skulls and their interpretation, again with many references to recent literature. The author rarely fails to give us his frank view on controverted questions, and even when we feel it difficult to agree, as must happen now and then, we feel grateful to him for a discussion that is both scientific and vivid. " Ancient Hunters " is a book to buy in its third edition even if we already have the first and second.

Human Geography of Cambridgeshire. J. Jones. 88 pp., 22 x 17 cm. Sidgwick and Jackson, 1924. 4/-.

Mr. Jones of Homerton is well known as a teacher who thinks out methods very carefully, and here he helps the teacher, wherever he may be, to use the facts of the home area. He does this not by general disquisition, but by taking his own region, Cambridgeshire, and dealing with it. There is a general description followed by a discussion of gateways and towns, and especially Cambridge itself, and this is followed by a long and valuable section on the villages and parishes, with attempts at the classification of types. An economic and then a demographic survey complete this useful book. It will be seen that this is no "chat" about the countryside, nor is it a gazetteer. It is most thoughtfully constructed and attempts systematic sorting of ideas. The numerous illustrations are chiefly based on O.S. maps. We would commend especially Mr Jones' help towards the interpretation of local boundary lines. This is a book for all teachers who are anxious to vivify their teaching by contact with actualities round about them; to all such in various districts the reviewer can but say, " Go thou and do likewise."

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THE ANCIENT MARITIME TRADE OF EXETER.

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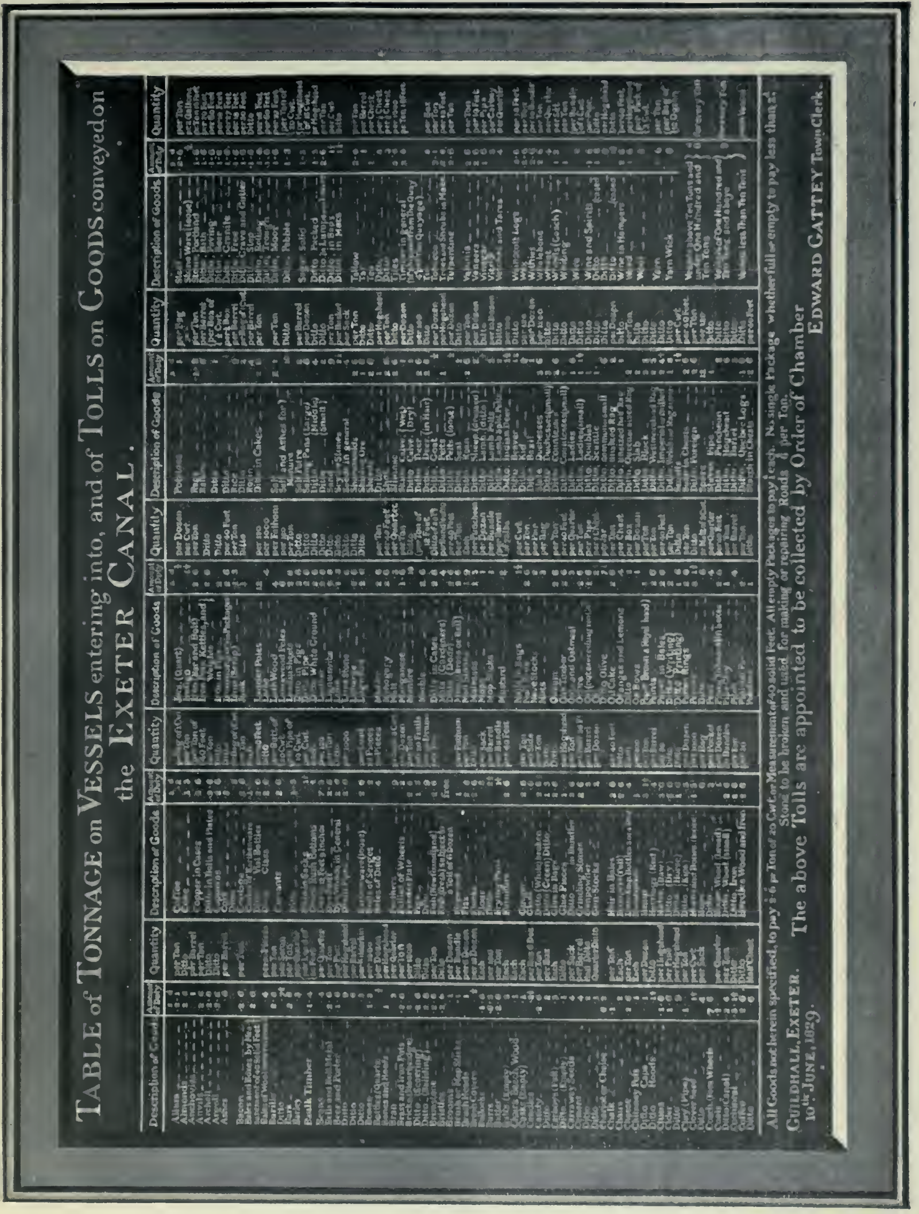
TO the casual eye of the hurried tourist there is little in modern Exeter that speaks of an intimate connection, past or present, with the broad and peaceful estuary over which it broods. Even from the observant traveller the City attempts to cloak its tiny harbour as though fearful of ridicule, and strives to keep his attention concentrated upon the height of the bluff where its civic life is now centred. Here is presented for his admiration a progressive community, apparently participating in the bustle of twentieth century existence, yet, beneath the exterior, subtly influenced by the stately and venerable relics of former centuries, constant reminders of the continuity of its development. But the tortuous and narrow streets that lead precipitously to the river, the arteries along which coursed the stream of its former prosperity, these the City hides from all but the most diligent explorers. No longer do these winding ways echo to the tread of pack-horses laden with bales of wool and cloth, blocks of tin and butts of Gascony wine. Affluence has given way to shabbiness and, in many cases, squalor. The very solidity with which the wealthy merchants of bygone days constructed their homes and warehouses has contributed to the perpetuation of their memory in decay. To the sympathetic seeker who looks beyond the facts such streets and buildings will reveal fragments of an impressive and moving story of decline from greatness and will stimulate him to reconstruct the record so imperfectly yet vividly outlined. His searches will carry him far afield and often along strange and comparatively unfrequented byways of knowledge. Laborious research in municipal and State archives will enable him to build up a structure that epitomises the evolution of maritime trade in Britain. Occasionally clues are brought to light by mere accident. The accompanying photograph shows one of the more interesting examples of such chance discoveries. The original is preserved in the local Historical Museum, where it has rested since it was rescued from masses of lumber by the present Town Clerk. Evidently an active and varied traffic by water existed a hundred years ago, but the initiation of these commercial relations dates back at least seven centuries before this. As to what may have been the condition in pre-Norman times there is no written record. Exeter had three important products to offer, wool, tin and leather, and foreign merchants profiting by the Norman encouragement of trade were quick to seize their opportunities ; records dated 1068 refer to the great number of foreigners in the city. There is nothing in the Domesday Survey to indicate that the woollen manufacture, which was to become the foundation of the overseas trade, had reached dimensions worthy of record. In fact no mention of it occurs until the time of Edward I., and the period of rapid establishment of wool manufacture over the region appears to be the first half of the 14th century.[1] During this time Flanders weavers were invited to improve the methods already in practice, and the industry was further stimulated by protective measures. The material produced was a coarse cloth described as "whitestraight," and the Customs Roll for 1398 shows this and dried fish as the principal exports from Exeter. Large quantities of "whitestraights" were destined for Brittany ; in return came canvas and cider, while the Rolls mention also wine, salt, copper, woad and fine linens. A Hundred Roll of Edward I. refers to the Gascony wine trade in Exeter in a manner that betokens it as of long standing. The passage of another hundred years found the woollen industry widely and uniformly distributed over Devon. In 1490 the Company of Weavers and Fullers was incorporated at Exeter, and the Customs Rolls about this time (1493) give further proof of the widening activities of the City in foreign commerce. In six months of the year sixty-seven ships entered and left the harbour, taking whitestraights, leather, pewter, tin, lead, and preserved fish, and bringing chiefly canvas, linen, wine, salt, oil, almonds, oranges, and tar, amongst other products. Although definite references are concerned solely with the ports of the north-western shoulder of France, the chain of intercourse clearly had a much wider extension. It is difficult to assess the magnitude of this early commerce, but, in 1538, during a controversy that followed the removal of the weekly market of wool, yarns and woollen stuffs from Crediton to Exeter, the sales were declared at £10,000 per week.[2] After a temporary decline during the reign of Mary, a Guild of Merchant Adventurers received a charter from Elizabeth to trade with France (1559). At this time, as a result of wars and plague, conditions were in a very parlous state, and the Guild directed its efforts towards rehabilitation. We read that no man in Exeter owned a ship; Topsham had replaced Exeter as the port by reason of the destruction effected from time to time in the haven by the Courtenays, who had thrown weirs across the channel, compelling all traffic to reach Exeter by road. It would appear that Venetian merchants suggested the possibilities of a canal to overcome these obstructions, and during 1560--1580 a waterway to suit vessels of about 15 tons was constructed; the oldest canal in the kingdom, it has endured to the present day. By this means the trade was recovered from Topsham, which applied itself to shipbuilding.

The minutes of the Guild are interesting reading. Among other things they reflect its importance in the social as well as the commercial life of the City. The members proceeded with great energy to renew direct contact with the old associations by chartering vessels; we read in 1566 of ships engaged to go to Malaga and Jerez for wine, to Algarve for figs, and so on. In 1578 they received permission to fit out their own ships for protection against the Barbary pirates and marauders off the French coast who interfered considerably with the Rouen and Morlaix traffic. Later they identified themselves closely with the exploratory voyages of the Gilberts, but do not appear to have availed themselves of the results, for in 1622 a Captain R. Whitbourne, on his return from Newfoundland, made an earnest appeal for a closer participation in the codfishing there, pointing out that the salt could be manufactured on the spot, thus saving the cost of getting it from France, Spain and Portugal.[3] But the real interests of Exeter lay with Europe and the East, and it was left to other ports in the South-West to develop intercourse with Newfoundland.

The annual value of the exports of woollens during the 17th and 18th centuries averaged £300,000, exclusive of sales to London and the East India Company. In 1700 four-fifths of the population were in some way connected with the cloth trade. Figures showing the number of pieces of cloth exported to Western and Mediterranean Europe point to the decline that commenced towards the end of the 18th century:—1768, 330,414; 1787, 295,311; 1820, 127,459.

The Napoleonic wars, the monopolies and restrictive policies of the Guilds, the lack of variety in the material produced, all these contributed to the rapid decay; the Industrial Revolution delivered the last blow. The cycle neared completion. With the decay of the woollen industry the decline of overseas trade went hand-in-hand. Writing in the year for which the tollboard illustrated was prepared, Moore gives manganese and woollens as the exports, and wine, hemp, tallow, coals, and groceries as the incoming



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EDWARD GATTEY Town Clerk.

By kind permission of Mr. F. R. Rowley, Curator of the Historical Museum, Exeter.

articles.[4] Trade was becoming coasting in character, and the growth of railways gradually reduced this to a negligible quantity.

In these notes it is impossible to do justice to the full story, nor can the 'rejuvenation' of the City by motor transport be considered. The map proclaims its possibilities as a nodal and market centre ; the growth of modern transport that once threatened ruin has brought prosperity in fresh directions. To the hills and vales around, Exeter still looks for the supply of its material needs, while from the past within its gates is drawn the inspiration to further evolution. The changing values of modern days are causing it to look inquiringly around to see if something may not be done to bring the waterway into an up-to-date and prosperous condition. The past was linked to the river, the present is bound to the road, the future may well be rendered more complete by a judicious utilisation of both in furtherance of the civic welfare.

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Magna Britannia (Devonshire). Lysons. 1822.
An Elizabethan Guild of the City of Exeter. Cotton. 1873.
K.R. Customs Account. (Public Record Office).

[NOTE.—It is hoped that readers will look up analogous tables for other ports and will work out comparisons.—ED.]

[1] For the distribution of mills and an account of the dimensions of the industry see "The Aulnager in Devon"—Pearse Chope, in Trans. Dev. Assoc. (1912), p. 568.

[2] Ancient Exeter and its Trade. Bowring. Trans. Dev. Assoc. 1872.

[3] Westward Hoe for Avalon. 1622.

[4] History of Devonshire. 1829.

Annals of Archæology and Anthropology. University of Liverpool. Vol. XI, No. 1. March, 1924. 6/-.

In this number H.A. Ormerod discusses ancient towns in the Greek Islands as places of defence and of refuge, while A. G. Russell takes up the study of topography of the Phliasian plain, the upper course of the river Asopus which reaches the south-east corner of the gulf of Corinth, a welcome contribution to knowledge of the physical features of the south Greek Highlands.

The Vegetation and Soils of Africa. H. L. Shantz and C. F. Marbut. 21 x 13 cm. American Geographical Society. Research Series No. 13, with cases containing 2 folder sheet maps.

Mr. Shantz crossed Africa from Cape Town to Cairo in 1919-20, and with the assistance of specialists he has endeavoured to make a vegetation map of the continent, Dr. Kearney contributing the N. African part of the map. J. B. Kincer did a rainfall map, C. F. Marbut a soil map, and Shantz and Marbut a land classification map. The book is richly illustrated with photographs, and is really an accompaniment to the maps. Various types of forests and grasslands and of cultivation in both are shown and discussed, and a number of soil-sections are given. One is often left with a feeling that the tendency to generalization has been carried too far considering how little is as yet known of the botany of Africa, and the maps are perhaps best looked upon as bases of discussion which should be carried on by persons who know the districts in question. We may have to use temporarily what may be called office-data, but they may mislead seriously unless we realise their limitations. Subject to this the book under consideration will be found of considerable interest. The student who takes it up would be well advised to have along with it de la Bathie's work, "La Vegetation Malgache," which is enlightening both as a study of the influence of man on vegetation and as an example of generalizations of a courageous kind, based on a large mass of personal observation. One of the most valuable aspects of the book is its multitude of references to literature on Africa.

REGIONAL SURVEY AND EDUCATION.

By NORMAN M. JOHNSON, B.Sc., L.C.P., Head Master of Kinglassie School.

DURING Sessions 1920-21 and 1921-22, the work attempted was twofold.

It included (A) the detailed study of a small area, and (B) the more general study of a wider district. This latter will be referred to later.

(A).

(1) The school itself formed a convenient starting-point, and after measurements had been made an accurate plan was drawn.

It should be noted here that elementary practical Surveying with chain and tape formed a convenient avenue of approach.

(2) Each child then made his own maps of the district immediately surrounding the school. These maps were on a scale of six inches to the mile, and the actual making of them formed a useful lesson in geometry. As each child required several maps, others were duplicated by the simple expedient of pricking through and joining points. These maps were utilised to show—

(a) Height of land.
(b) Communications.
(c) Crops.
(d) Positions of birds' nests.

Other work done comprised the making of a migration map and also a rookery survey, both being co-operative efforts. The latter was rather too ambitious, including, as it did, the counties of Fife and Kinross.

At the conclusion of the work, done as described, a visit was made to Blythe's Tower—the school " Outlook Tower "—and the immediate school district was linked up with a considerable area of the Scottish Lowlands. All prominent points were identified, and each child drew an outline panorama.

During session 1921-22, the work done included the following :—

The district chosen for detailed study was that surrounding Blythe's Tower, occupying an area of 1½ square miles.

Maps on a scale of six inches to the mile were traced from the O.S. map of the district and duplicated. Some showed contours only, others were more detailed and included fields. The district was then studied, and the maps coloured to show—

(1) Height of land and watercourses.
(2) Geology.
(3) Vegetation.
(4) Communications—position of farms, etc.
(5) Farm boundaries and density of population.

Place and farm names were also studied.

With reference to (2) soil samples were examined by the pupils themselves, with a view to ascertaining (a) water content, (b) humus, (c) water-holding capacity.

With reference to (3) the following were indicated: (a) pasture, (b) cultivation, (c) woodland, (d) scrub, and the average altitude noted to which cultivation is carried on.

It was not possible to construct a history map for this particular section, but an old map of the village, dated 1778, was studied, and a number of interesting points emerged, regarding former industries, roadways, watercourses and buildings, and also famous men.

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The interdependence of geology, altitude and cultivation was duly noted, and a plasticine model of the district was constructed. While this work was proceeding, a wider area was studied with a view to applying the valley section method to it, and after a large diagram had been made co-operatively, each boy made one for himself. I then commenced to apply the valley section method to a still wider district, extending from the West Lomond to Kinghorn, the resulting diagram, although incomplete, being used for teaching purposes.

The following will give some idea of the questions and exercises which were given to the pupils, and which were answered by mapping, orally, or in writing:—

1. Position. (1) Find out the latitude of the district. (2) Mark the district on a one-inch map, and note its distance from important centres. (3) What kind of district is it? State whether hilly, etc. (4) Find area. (5) Number the contour lines. (6) Draw a section through the tower to the school. (7) Indicate wells, springs, streams, and the reservoir from which the village obtains water.

2. Geology. (8) Indicate the kind of rock underlying the surface. (9) Is coal found? (10) Are there any quarries? What kind of stone is found? What has this stone been used for in the past?

3. Vegetation. (11) To what height is cultivation carried on? What is the average height? (12) Draw a line on your map showing the separation between cultivation and pasture. (13) What is found beyond this line? What is the ground used for? (14) Find out what crops are grown, stating the chief crop first. Which crops grow on the higher ground? (15) Are the woodlands many or few? Give reasons. Which kind of tree grows on the higher ground? (16) Mark where scrub occurs (whins, brambles, etc.).

4. Historical. (17) When was Blythe's Tower built and why? (18) When was the church rebuilt? (19) Find out what you can about Finglassin's Well. (20) Where was the original school? (21) When was the third school built? the fourth? (22) If possible, find the meanings of place and farm names. (23) What famous men were born in Kinglassie or have a connection with Kinglassie?

5. Communications, etc. (24) Indicate on your map main roads, farm roads and rights of way. (25) Find the number of people living at farms and cottar houses, and calculate density of population, i.e., number of people per square mile. (26) Indicate farm boundaries, and after working out (25) give a reason for the sparsity of population.

6. Bird Life. (27) Certain birds are found on hills, others in woods, near water, or amongst cultivated fields. Make lists of the commonest birds seen or heard (a) on the hill, (b) in the cultivated fields, (c) in the gardens, (d) near the Lochty, (e) in the woods. Indicate these names on a map in the appropriate parts.

There is no doubt that in Scotland at least, owing to examination conditions, such work in detail can be carried out only by supplementary pupils. In the hands of a sympathetic teacher, however, there is no hindrance to the Regional attitude being adopted throughout. It may be a surprise to many teachers to know that Regional work is recommended in the Scottish Code, or rather, in the Scottish Education Department's Memorandum on Nature Study and the Teaching of Science in Scottish Schools, which forms an appendix to the 1915 Code. One quotation must suffice: "Many items worthy of record would occur to the thoughtful teacher, and the pupils themselves would suggest others as they got more deeply interested in the work. Ultimately the various records so obtained might be collated, arranged, classified, and where necessary, amplified to form part of a general Regional Survey of the whole district surrounding the school. Given favourable conditions, a school might even aim at building up its own 'Book of Regional Survey,' which, when complete, would be a storehouse of valuable information concerning the locality. The organisation and conduct of this Regional Survey would be the particular charge of the pupils beyond the stage of the Qualifying Examination."

APPENDIX I.

Tabulated List of Maps, Diagrams, etc., forming the Kinglassie School Survey.

The following list of maps, plans, diagrams, sketches and specimens, which are now in existence, will give some idea of the scope of the work undertaken :—

1. Large scale plan of School.
2. Map of village on scale of 25 in. to 1 mile (O.S.).
3. Index map of county showing parish (O.S.).
4. Index map of Scotland showing position of 1 in. to mile Sheet (O.S.).
5. I in. to mile map of district in which village lies (Sheet 40. O.S.).
6. 6 in. to mile maps (O.S.). Four of these are necessary, as a part of the school district is on each one.
   O.S. Maps are mentioned as they form the foundation of the work done.
7. Maps of a wider district than school district on scale of 1 in. to the mile to show :—
   (a) Geology.
   (b) Relief. Water-courses.
   (c) Vegetation.
   (d) Communications.
   (e) History.
   (f) Bird life.
8. Maps of school district on scale of 6 in. to the mile to show :
   (a) Geology.
   (b) Relief. Water courses.
   (c) Vegetation.
   (d) Communications.
   (e) Farm Boundaries.
   (f) Fields and field names.
   (g) Antiquities.
9. Lists of place and field names.
10. Drawings of antiquities.
11. Notes on buildings in village.
12. Drawings of same.
13. Notes on investigation of local natural waters.
14. Notes and sketches re Kinglassie's viewpoint—Blythe's Tower (altitude, 605 feet).
15. Large panorama showing extent of view from Blythe's Tower.
    (a) Diagrams showing application of "Valley Section" to (a) immediate district, (b) wider district extending from W. Lomond to Kinghorn.
16. Detailed Notes on Bird Life.
17. Detailed Notes on Wild Flowers.
18. Detailed Notes on Soil investigation.
19. Large scale plans of local farms with information as to buildings, etc.
20. Maps and plans, sketches and notes forming a preliminary survey of Clunie Bridge, a hamlet within the Parish.
21. Do. do. re The Commons, another hamlet.

22. Survey of Children's games giving details as follows:—
    - (a) Words used in singing games.
    - (b) Words used in skipping games.
    - (c) Music used in singing games.
    - (d) List of outdoor games (summer).
    - (e) List of outdoor games (winter).
    - (f) List of indoor games.
23. Notes on education in the village.
24. Map showing positions of various schools in the village.
25. Industries, past and present. Details of local colliery.
26. Local names of birds. Migration maps.
27. Results of weather study.
28. Specimens:—
    - (a) Coins found locally.
    - (b) Antiquities—flints, etc., found locally.
    - (c) Geological specimens.
    - (d) Collection of local birds' eggs.
    - (d) Miscellaneous specimens found locally.
29. Maps of Kinglassie Parish to show (a) Places, (b) Work-places, and (c) Folk-places.
30. Study of houses. Drawings, plans, and descriptions.

"La Nature" for January 28th, 1924 (Masson. Boul. St. Germain, Paris, 1 franc), contains a short but suggestive article by A. Dauzat on old types of rural habitation in France. He shows how much historical facts have interfered with local circumstances. The Gallic house is defined as having an acute angled roof, originally thatched, a rectangular plan with the narrower side of the rectangle under the gable and the broader side making the façade. In the earliest varieties there was one room for human beings and one for animals, and the house stood in a courtyard, around which farm buildings spread in due course. The original general distribution of this house over Gaul has been limited by the spread of a Latin type from the south-east through Aquitaine, Poitou and Vendée to the mouth of the Loire and up the Rhone Valley to Tournus and towards Clermont Ferrand via Lyons, leaving a large part of the Plateau Central to the Gallic house, which is also found in the Pyrenees and in parts of the French Alps. The Latin house has a roof sloping but slightly, if at all, it is rectangular, with the facade shorter than the side, it provides for the human beings above and the animals below, and typically had at first an exterior staircase. Any courtyard would be very small in most cases. Dauzat discusses an island of Latin houses in Lorraine and refers to the Norman, Basque, Jurassic, and other types of dwellings as well. His view about Gallic and Latin dwellings is interesting in contrast with that of Meitzen, who seems to have credited the Franks with the introduction of Dauzat's Gallic type from Germany. Here Dauzat's facts about distribution seems convincing if confirmed. One could not understand the Frankish imposition of a type of house in French Alps and Pyrenees when it did not occur in the Rhone and Garonne basins to any extent. If the Latin type spread even partly in Roman times, the Gallic type would seem to be older, i.e., to be pre-Frank. And if the house and its setting in agglomerations, then how about the village which Meitzen, again, considered Frankish?

REVIEWS.

History of Assyria. By A. T. Olmstead, Professor of History, Curator of the Oriental Museum, University of Illinois. Large octavo, pp. xxxii, 695. Coloured frontispiece, map, and numerous illustrations. Charles Scribner's Sons, London, 1923. 30/-.

This is a vigorous and suggestive piece of work. The writer is an expert Assyriologist, and draws his materials direct from original and for the most part centemporary documents. He has travelled and excavated; he has a keen eye for country and for artistic style; and he has not only the professional training of a historian, but that much rarer thing, the gift of making his periods and his characters live. Having already published much detailed material, and discussed the more important and difficult problems of Assyrian history in specialist journals, he has felt himself free to leave this kind of learning on one side, and devote himself to the broader and more generally instructive aspects of his subject: but he has set himself to make Assyrian history literally from Assyrian materials; and his habitual and skilful use of verbal quotations from original sources gives a vivid realism to his narrative which is rare in a general history.

For the geographer, the most notable part of the book is naturally the earlier, where the physical features of Assyria and the neighbouring regions are described and analysed in some detail, and linked with the main aspects of the culture and national spirit of a remarkable people. The ethnic elements of this people, the nomads of Arabian steppes, the mountaineers and foot-hill cultivators of the "fertile crescent" and the amphitheatre of mountains which encloses it, and the date-fed, sedentary Babylonians, "good business-men, devoted to their every-day occupations, highly religious, unenterprising, and the prey of each successive invader," are sketched with a sure hand. For the earliest settlements of civilized men in Assyrsia, Dr. Olmstead has had at command much still unpublished material from the German excavations at Asshur, interrupted by the war; and his account of this newly-won phase of Assyrian adolescence will be news to all but the specialists. The originality of Assyrian character is well illustrated from the remains of early Assyrian art. "When we turn from the Babylonian to the Assyrian records, we are at once conscious of a new atmosphere. We pass from the presence of mediocrities into a group made up of individuals. As individuals they may be far from likeable, but we never fail to realize that they actually lived and were vital forces in their world." "The Assyrian was frankly and honestly an imperialist," and though Dr. Olmstead does not like imperialists, he realizes that the "frightfulness" with which the Assyrian is credited by historians partly results from the frankness and honesty with which Assyrians wrote about their own doings. "There was bloodshed and cruelty in his warfare, and he did not understand why he should not relate what he did." But while he does ample justice to this side of Assyrian chronicle, Dr. Olmstead is able, out of the fuller knowledge now accumulated as to the social habits and daily life of the people, to reduce these gory details to their proper place in the picture, and supplement the victory-bulletins with the correspondence of the viceroys and administrators whom the court and the army left behind to "carry on" when the battle and the shouting were over. "Why have you gone out with your servants and carried off the booty? So, on account of this matter I was disturbed and am come." The words are those of Nabu-bel-shumate; the strong hands were those of any bearer of the "white man's burden." In more senses than one, "imperialism and imperialists are always terribly alike." They have no use for transgressors of their law.

Naturally, the period of Assyrian history which is most familiar to the general reader is that in which the offenders against the Assyrian "raj" were the "chosen people" of Old Testament literature, and Dr. Olmstead has little difficulty in showing that the rhetorical squeals of detected conspirators and defeated rebels are not to be taken at their face value. What is less obvious, he makes a good case for discounting the literary "frightfulness" of the Assyrians' own narratives. "The historian's task is neither to whitewash nor to blacken; it is to understand," and the "official Assyrian records demand as drastic a higher criticism as has ever been inflicted upon any part of the Old Testament." This is in refreshing contrast to the mere acceptance of cuneiform evidence—just because it is contemporary and cuneiform—by some of the earlier writers of Assyrian history; and it gives a special value to Dr. Olmstead's closing chapter of summary and judicial estimate of the people of his choice. "The Assyrian was a human being; being such, he was very much like ourselves . .. All in all he was a man, and a capable man; he suffered the usual human limitations, he was a child of his age." In the opinion, in fact, of a life-long student, and a very candid admirer, the "Assyrian wolf" was "the shepherd dog of civilization" in his own day and country; "and he died at his post," for he was "bled white in the process" of making the world safe for imperialism. J.L.M.

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Particulars of Courses beginning in October, 1925, for Students of Geography, including those for the Diploma in Geography, may be had on application to the Secretary, University of London, University College, Gower Street, W.C.1.

Indians of the North-west Coast. P. E. Goddard. 176 pp. + 1 map, 21 x 14 cm. American Museum of Natural History, 1924.

We have previously had occasion to give warm appreciations of the handbooks of the American Museum of Natural History, and this one is a worthy member of a valuable series. It gives a short general discussion, followed by details on material culture, social and political organization, religion and art, and fortunately it includes a bibliography. The North-west has highly developed wood, bark, reed and grass work, involving both joinery and weaving. The social features include the famous feasts which may be given by men who have inherited or acquired certain honours and names; these feasts are of great importance as conferring high rank on the givers, whose accumulated wealth will probably be dispersed for the sake of the feast. Potlatch is a Chinook work meaning "to give," and the name is applied to a whole group of festivals gathered around the first birthday, puberty, maturity, betrothal, marriage, return of presents by the man's father-in-law some years after a marriage, burial. Distributions and even destruction of property by the giver of the feast are frequent occurrences at these feasts. The purpose of potlătch is to impress the public mind. Geometrical designs, figuration in wood, designs worked on the face, designs in blankets, are all given considerable attention in this work. The whole series on various North American Indians will be found invaluable for reference purposes.

The Home of an Eastern Clan: A Study of the Palaungs of the Shan States. By Mrs. Leslie Milne. pp. viii, 428. Oxford, at the Clarendon Press, 1924. Price, 16/- net.

Mrs. Milne's book on the Palaungs of Burma is in many respects a remarkable achievement. When she first came into contact with this interesting people in 1906 at Rangoon and at Mandalay, the Palaung language had never been seriously studied. With no material available to assist her beyond a comparative list of vocabularies published in 1900, she set to work to learn the language, compiling vocabularies from such Palaungs as she could meet on her travels. She paid her first visit to their country in 1912. This book is the outcome of her linguistic studies, for in aiming at a complete knowledge of the language she was compelled to explore thoroughly every department of their life. This she describes literally from the cradle to the grave, for she begins with the baby, follows him or her, as the case may be, through childhood, adolescence, marriage, home and village life, industrial occupations, in relation to law, in health, in sickness, and in death, rounding off her tale with religion, both Buddhism and spirit worship, cosmogony, and folklore. Her comprehensive survey of all sides of Palaung life and belief is equalled by the minute care with which she has dealt in detail with each department. The Palaungs are an isolated and little-known remnant of the Mon-Kmêr races—the first invaders of Burma, who were themselves driven to the hill tops by the later incoming Shans. Since then they have lived under the domination of the Shans. Their origin and history render them of no little importance to the student of the ethnology and linguistics of this part of Asia. Mrs. Milne's book deserves to rank high in anthropological literature as a careful and sympathetic account of a very interesting people. E.N.F.

The New World. Bowman. vi + 112 pp., 24.5 x 16.5 cm. George G. Harrap and Co., Ltd., 1924. 21/-. New edition.

Dr. Bowman's well-known book, "The New World," has filled such a useful place that this new edition is very welcome. It contains 112 pages of additional supplement, bringing the work up-to-date, and especially discussing various crises that have arisen since the first book was written. There are 56 pages discussing the present position of the United States, additional notes on each of the previous chapters, and a supplementary appendix giving the outline of treaties and resolutions adopted by the Conferences on the Limitation of Armaments and also the Tacna-Arica-Protocol. The supplement to the index is separate, and also illustrated

The Children's Story of the British Museum. M. G. Mattingly. 186 pp., 19.5 x 12.5 cm. Mills and Boon, Ltd., 1924. 5/-.

Teachers, and especially teachers who have a chance to take children to the British Museum, will welcome this most attractive and useful little book. The contents include The Story of the Founding of the Museum, The Stories of Ancient Greece, Rome, Babylon, Egypt, etc., and there are also chapters on primitive man, early Christianity, and the religions of the east. To some of us the chapter on Books and Manuscripts will be particularly interesting. Among the illustrations are the famous Chinese Lohan, perhaps the most beautiful example of its kind now extant, the Assyrian Winged Lion, and the vigorous Mithras Sacrificing Bull.

British (Terra Nova) Antarctic Expedition, 1910-1913.

Physiography (Robertson Bay and Terra Nova Bay Regions). R. E. Priestley, M.C., M.A. 7/6 net.

Physiography of the Beardmore Glacier Region. C. S. Wright, M.C., B.A. 5/- net.

Physiography of the Ross Archipelago. F. Debenham, B.A., B.Sc. 5/- net.

Report on the Maps and Survey. F. Debenham, B.A., B.Sc. 10/- net.

London: Harrison and Sons, Ltd., for the Committee of the Captain Scott Antarctic Fund, 1923.

These memoirs contain a wealth of material on Antarctic physiography, and will repay the time spent in study by any teacher who is ambitious to escape to first-hand information from the stultifying atmosphere of text books. Three physiographers deal with different regions in South Victoria Land, and their conclusions might well be compared with those reached by Dr. Griffith Taylor, or, at an earlier date, by Prof. Edgeworth David. Mr. Priestley insists that the two agents of first importance in sculpturing the Antarctic land surface are subaerial and glacial erosion, and as regards the latter he takes a less conservative view than Dr. Taylor. Many glaciologists, some of whom have never seen ice except on a puny scale, regard glaciers as inefficient agents of erosion. The lack of glacial deposits on a large scale in the Antarctic, Mr. Priestley considers to be a geographical accident rather than a result of the inefficiency of the glaciers. The small exposed rock areas in Antarctica free from ice at present have frequently little or no moraine material. Many causes may account for this: recent volcanic action has produced some of these areas, others are too precipitous to hold much material, and others again were never engulfed except by the upper layers of glaciers glancing over them as the main stream passed by a more direct and easier route. Most important of all is the fact that most Antarctic glacial debris is deposited not on land but in the sea, and so is hidden from view. Of this there is good evidence. The important question of the speed of glaciers in relation to erosion is also discussed. Stagnant ice being obviously protective, this question has a great bearing on the sculpturing of Antarctic lands. In his memoir on the Beardmore glacier region, Mr. Wright has much to say on these problems, and gives some striking evidence both of the efficiency of moving ice in sculpturing a land-mass, and of the preservative action of stagnant ice.

It is impossible in a brief notice to do justice to these papers or even to mention the numerous important topics that the several authors discuss. Attention should also be drawn to the abundance of fine illustrations.

The volume on maps and survey contain the full charts of Captain Scott's expedition, which are now made available at a modest price. Mr. Debenham has earned congratulations for completing this important piece of work. R.N.R.B.

Memories of Travel. Sir Thomas Graham Jackson, Bart, R.A. 172 pp., 23½ x 17 cm. Cambridge University Press. 10/6.

The author claims for his book that it is but a variety of slight sketches from memories of travel in youth and middle age, and is intended to depict " only the lighter incidents of travel." The sketches are selected for the sake of variety, and deal with France, Italy, Austria, Dalmatia, and the Near East. The memories are written with all the freshness of recent experience, but they carry one back to the last quarter of the 19th century, and manage to convey something of the restful deliberateness of travel in the "seventies" and later, before the rush of train and motor. Incidentally, they give the author the opportunity of noting changes in the national temperament, for instance, in France, during the last fifty years.

The sketches are full of geographical interest. They come from the pen of an architect or artist, whose business it is to wander from the main path and to find time to stay and sketch, and whose contact with the people is consequently intimate and natural. Thus the "lighter incidents of travel" become real sidelights on the human geography of the district, as, for instance, in the accounts of the gaiety of a French inn at Avallon in 1867, of the transhumance of the dwellers on the Hautes Alpes or of the independence of the fishing communities of the Borromean Islands. To read the chapter on Constantinople is to realise the meeting—but non-mingling—of East and West, while that on the Dolomites brings out vividly the physical facts of the extent and effect of September rainfall at the head of the Adriatic.

Sir Thomas Graham Jackson says he has avoided more than " casual references to architecture," but these references are very suggestive, and the value of the book is increased by the insertion of fourteen of his own drawings. S.H.

The Nations of To-day: France and Italy. Two Vols. Edited by John Buchan. 23 x 15 cm., 320 pp. Hodder and Stoughton, 1923. 15/- net each.

There has long been need for a series of this kind. It presents a double claim, though it is too much to expect both " A New History of the World " and the story of " The Nations of To-day " in so limited a space.

The historical matter contains nothing new, and a good deal of it might have been sacrificed to make room for a more adequate account of economic and political problems of the present day. These last are intimately related to geographical causes and circumstances, and it ought to have been possible to devote more than five pages to Italian and seven pages to French geography.

The volume on Italy contains some useful data as to the economic changes in the last half century which have industrialised an agricultural state. But the material is all presented in an abbreviated form, and surely a bibliography which omits the Italian studies of Dr. Trevelyan, is hardly worthy of the name.

The French volume is the least satisfactory of the whole series. There is as much nonsense in Mr. Belloc's chapter on " The Land of France " as in the altogether unworthy preface of M. Tardieu. Mr. Belloc talks about a " French race " when he means the French people. He dismisses the " guesses of anthropologists " as worthless. " A national type," we are informed, " is a thing which anyone can recognise and bear witness to. It is a reality. The other categories are guesswork or illusory."

His claim that French geographical centrality has given France " a sense of proportion " in international politics is an extravagant one, as is the claim that " it makes the French the only people familiar with having a long maritime tradition of the inner and the outer seas; in modern terms, it makes them potentially both a permanent Mediterranean and a permanent Atlantic power." This is a good deal worse than the popular description of England as " a seafaring nation."

The brilliant French regional monographs ought to have provided Mr. Belloc with material for a more solid contribution than this.

In both volumes too much space is given over to a description of war activities. An otherwise valuable reference series has been rather spoilt by an over hasty production. It seems to lack the qualities which would call for a second edition in the near future.

W.A.G.

By Camel and Car to the Peacock Throne. E. Alexander Powell. 22 x 14½ cm. 386 pp. + illustrations and index and folder map. John Long Ltd. 1923. 15/-.

This book is one which will cerainly attract a wide public; it combines a narrative of a thrilling cross country journey from Constantinople through Syria, Arabia, Iraq and Persia to Teheran (the city of the Peacock Throne), with serious discussions of the problems and prospects of this frontier region between two civilisations. The numerous photographic illustrations and the clear and picturesque descriptions of the people and places the author saw en route, make the book a useful storehouse for those studying this region, and it has the added value for teachers that it is written in a style calculated to make it most attractive to upper form boys and girls. It has one very valuable aspect for British readers; it presents to them a vision of ourselves as others see us, and narrates the sequence of our dealings with these regions from an outside nation's point of view. The following extracts will show the fine descriptive quality of the book. " The only spot on the entire sea-board of the great peninsula where the white man has succeeded in maintaining a foothold is Aden, to whose sun-scorched rocks a British garrison clings . . . . The Arab has had three allies, the harbourless, surf-pounded coast, the desert, and the sun. Particularly the sun . . . . What threat could be offered by a European army to a people habituated to a climate where the mercury frequently rises to 130 deg. (and no shade!) and has been known to drop 70 deg. in half-an-hour; who can live for days on a handful of dried dates and a bowl of milk; whose tented cities can vanish in an hour; whose swift dromedaries, when pressed, can cover four score miles a day; and who are convinced that the surest way of gaining paradise is to die in battle with the unbeliever? " " All day long, day in and day out, we rode across a burning, desolate waste . . . . The whole of our world had become a flat-brown disk, reflecting the scorching sun-rays as from a plate of copper . . . . The sun is pitiless, implacable, terrifying. It pursues one mercilessly, beating down upon one's head and shoulders with a vindictiveness that seems almost personal . . . The dust stirred up by the camels rides in suffocating yellow clouds, filling nostrils, eyes, and ears. A mighty, invisible finger seems to be pressing intolerably on one's brain and spine . . . . The heat waves dance and flicker above the unending waste. What appear to be purple storm clouds rise and fall dizzily on the cloudless horizon. Occasionally there is a breeze, but it is so laden with heat that it is like a blast from a furnace-door."

Galapagos: World's End. William Beebe. xxi + 443 pp., 27 x 19.5 cm. G. P. Putnam's Sons, 1924. 42/-.

This very important and finely illustrated book well deserves Henry Fairfield Osborn's comment that "the 'Noma' Party accomplished results, artistic, photographic and observational, which are entirely without rival." Students of Darwin will especially welcome it, for the chapters on Galapagos in the "Voyage of the Beagle" are peculiarly interesting. There is, of course, much that is of value to the zoologist, as such, but every geographer should read the book, for to have a detailed description of scenes, of climate, of fauna, and of flora in islands that are all but on the equator, is no small asset, It may be added that there are eight coloured plates and 82 other illustrations, and that the expedition was organised by the New York Zoological Society, and was staffed by skilled artists, photographers, taxidermists and scientists, so that the data is reliable and well chosen. Altogether it is a book on which both author and publisher are to be congratulated.

1. **Recent Geographical Work in Europe.** W. L. Joerg. 25½ x 17½ cm. American Geographical Society.

2. **Geography in France.** Emmanuel de Martonne. 19 x 12½ cm., 70 pp. American Geographical Society.

Mr. Joerg has contributed to the American Geographical Review (1922) a paper, also published separately, reviewing the position of geographical teaching and research in Europe. It is a generous appreciation of the good points of many schools and workers, and we cannot but be glad to see that honour is done to the late Professor Herbertson in England and the late Professor Vidal de la Blache in France. The publication is invaluable to all who wish to keep up with advances of thought in the various countries. Under Mr. Joerg's general editorship, Professor de Martonne has written a booklet (No. 48) for the Research Series of the American Geographical Society on Geography in France. He reviews societies, commissions, and universities, as well as the work of government departments which help geographical research, and he completes his study by a discussion of geographical publications. The enormous influence of Paris is very evident, but there is a welcome tribute to the enterprise of the department of geography at Grenoble. Some of the thoughtful criticisms which one can read between the lines of this book are illuminating.

New Additions to Series.

Human Geography. J. Fairgrieve and E. Young. iv + 212 pp, 19 x 12.5 cm. Messrs. George Philips and Son, Ltd., 1924. 2/6.

1.—Teachers who use the "Human Geography" Series of Messrs. Fairgrieve and Young will welcome the new volume, "The British Empire," price 2/6. The authors state that their aim has been "to build up a conception of the British Empire as a whole rather than to give a minute account of its constituent parts," and we congratulate them on their success. The book will meet the needs of scholars in the upper standards of elementary schools or in the middle forms of secondary schools.

2.—The Cambridge University Press issues two further volumes of their well-known County Series:—**The East Riding of Yorkshire,** by Bernard Hobson, and **The Isle of Wight,** by Telford Varley.

The Possibilities of British Agriculture. Sir Henry Kew and Sir E. J, Russell, with a foreword by Lord Bledisloe. 22 x 14 cm, 32 pp. John Murray, 1924. 1/-.

The names of the authors stand for much serious work in research for the betterment of agriculture in Britain, and are a guarantee that even in such a small pamphlet some food for thought will be found. Some interesting tables are given, and the summary of results and enquiries is by no means pessimistic as to the future, which, in the authors' opinions, will depend on the better education and wider outlook of the present generation of young farmers. Every teacher who is making a study of the British Isles should get this useful little book.

Sheffield. Civic Survey and Development Plan. Patrick Abercrombie. ix + 85 pp., 33.5 x 26 cm. University Press of Liverpool, 1924. 15/-.

This is a notable result of a worthy effort by the citizens of Sheffield and Professor Abercrombie of Liverpool to make a geographical study of the life of their city with a view to its improvement. Our big English cities are for the most part a disgrace to our civilization with their myriads of mean streets allowed to continue side by side with enormous wealth that arises from our slackness in enforcing the insertion of items for social depreciation into industrial balance sheets. There is hardly one big town in the country that is at present fit for the up-bringing of children, and it is therefore good to see that steps are being taken to study scientifically the questions involved. One welcomes and honours the work of those who, like Dr. and Mrs. Shrubsall, collect facts about the health of town children and use them for the public benefit, and one honours the initiative of Patrick Geddes and his town planning followers who are trying to wipe out our national disgrace. It is interesting that Sheffield has taken up the idea of survey and that the press of Liverpool University has printed and published the survey with such skill. The preparation of maps by a skilled architectural draughtsman with blank overprints over grey lines, is most interesting to the geographer. We may mention that one ominous map represents " The Smoke Area." Similar maps could be made on a large scale and exhibited in the town halls of the big cities of England by teachers of geography with, it may be, great advantage.

The suggestions made are practical and detailed, and will no doubt serve as a basis of discussion into which it is hardly appropriate for outsiders to enter. We may content ourselves with congratulations to Prof. Abercrombie and to Sheffield, and add the hope that officers of many branches of this Association will borrow this book from the Association's Library and then buy it, and set to work to get surveys done for their own towns, large or small. The need is very great.

The Development Planning of Town and Country. D. Lleufer Thomas and P. Abercrombie.

This pamphlet is an eloquent statement of the general case for surveys and planning, which are hardly less necessary in the country than in the town. The pamphlet includes essays by the two authors, both of whom are well known for their work in this direction. One may recall the fine report of a few years ago on Industrial Unrest in South Wales published as a white paper. It is well known that Mr. Lleufer Thomas was largely responsible for it, and that it stated admirably the case for planning of industrial areas.

Geography and Australian National Problems. Griffith Taylor. Contribution to the Australasian Association for Advancement of Science. Vol. XVI, 1923. pp. 433 — 487.

Prof. Griffith Taylor took as the subject of his presidential address to the " Geography and History " Section of the Australasian Association for the Advancement of Science for 1923 the question of geography in its relation to Australian National Problems. Geographers will be prepared for bold and original treatment, which never omits to consider Australia in its world relations, and so develops an interest beyond that of many papers on regions which limit themselves too much to that region alone. Prof. Taylor believes that the adult male with outdoor activities can live as healthily in the Australian tropics as anywhere else. He does not think this can be said of women and children, and he notes that high temperature, more than rainfall conditions, is an important factor of infantile mortality. He points out further, that as regards comfort the tropics lag behind so much that few settlers will endure the discomfort of the tropics as long as there is room for them in the south. He thinks Australian cotton has an important future if the labour problems can be solved, but he adds quite frankly that there are no immense areas of fertile soils such as there are in U.S.A. or India. Many of the opinions expressed might be discussed and perhaps adjusted, but the address is unusually stimulating and valuable.

In the Footsteps of Livingstone. Alfred Dolman. 269 pp., 23 x 15 cm. John Lane, The Bodley Head, 1924. 12/6 net.

This book has a poignant interest, for its author, whose career seemed so full of promise, died at the age of 24 in tragic circumstances. He was a fairly experienced explorer by that time, having made several journeys, beginning with a trip at 16 years of age to the Cape and up the West Coast, and, later, a four months' stay in the Cape and a visit to Mauritius. The diary of his three journeys is crisp and clear, and holds the reader's interest from start to finish. There are good sketch maps, and several interesting sketches by the author, and the frontispiece is a coloured reproduction of a delightful water colour painted by Dolman on his last journey, dated 18/11/51, and showing a scene on the Zouga River. The diary is calculated to bring home vividly the reasons that kept Africa so long an uncharted, unexplored region, and we recommend it heartily to both teachers and scholars.

The Certificate Geographies. (1) Africa. By Evans Lewin. 220 pp. + index. 3/-. **(2) The Mediterranean.** By O. J. R. Howarth. 170 pp. + index, 19 x 12½ cm. 2/6. Clarendon Press, Oxford, 1924.

These two text books in the Oxford University Press series will undoubtedly meet a need which has been felt by teachers for some time. The names of the writers are a sufficient guarantee of the reliability and broad outlook of the books. The print is clear, the illustrations good, and the style sufficiently simple to make them attractive to most secondary school children, and probably to the upper classes in some elementary schools.

A Geography of Burma for Schools. F. G. French and L. Dudley Stamp. 151 pp., 18½ x 12 cm. Longmans, Green and Co., 1924.

Those of our readers who remember Dr. Dudley Stamp's article on Burma will welcome this geography for scholars, which is particularly noticeable for its very clear diagrammatic maps, showing build, direction, position of towns, etc. The scheme is well thought out, the wording clear, and each chapter has a series of useful questions and exercises appended to it. There are 12 pages of very important tables giving temperature, rainfall, production and trade added at the end. Every teacher who is taking Burma with the class, will find this book, written by geographers who are on the spot, invaluable.

Amurath to Amurath. G. L. Bell. xvii + 370 pp., 23 x 15.5 cm. Second Edition. Macmillan and Co., Ltd., 1924. 21/-.

The second edition of this book, which was published first in 1911, is very welcome. Miss Bell's scholarly style is too well-known to need comment, and teachers both of geography and of classics will be glad to know that it is now again available.

The Southern Sierras of California. Charles Francis Saunders. xii + 367 pp., 21 x 13.5 cm. Hutchinson and Co., 1924. 16/-.

This is a chatty and discursive account of a region which has evidently won the author's whole-hearted affection. There are some very beautiful photographs, some of which, e.g., pp. 147, 159, 165, 171, give illuminating ideas of the topography and vegetation of the region. In the preface, the author says that " holiday visitors receive from this region that sure comfort which the name given to the chain by the old Spaniards—' the Mother Country '—may be taken to promise." He says that " it has been his purpose to convey something of this kindly, human quality, rather than scientific facts about rocks and glacial evidences," and he has certainly succeeded in this purpose.

A New Zealander in Many Lands. Allen. 191 pp., 12.5 x 19 cm. The Epworth Press, London, 1924. 5/-.

The title of this book seems to be a little misleading, for there is very little about the New Zealander and his outlook, nor does it even seem that the author in the strict sense of the term is a New Zealander. The author has visited America, England, Egypt, Greece, Italy, Norway, and Russia, but in this book he does not give us much of his impressions of the place, but does give us a sort of expanded guide book series of notes on the history of the various places. Naturally this results in a somewhat uninspiring treatment, of which the chapter on Athens is a striking example, but considering its small price, the book is beautifully illustrated and wonderfully packed with information, and will no doubt be of some service in the school library.

India: A Bird's Eye View. By Lord Ronaldshay. 23 x 15 cm., pp. xi + 322. Constable, 1924. 18/-.

The author's well-known interesting and original style and knowledge of the country about which he writes make it a foregone conclusion that this book will attract a wide public. The illustrations are beautiful, and give one not only a clear idea of the people and their occupations, as in the photograph of the potter at his work, but also an idea of the buildings and the curious rock sculpture, as on page 39. His introductory chapter on " What is India?" gives one some notion of the extraordinary variety and romance involved under the name, though, of course, one cannot answer such a question as " What is India? " even in 12 pages. The book itself is perhaps a better answer to the question. It touches upon the frontier and its problems, the Afghan war and its aftermath. There is an attempt to assess the effect of the imprint of Great Britain on native life, and the chapter on the native village contrasts strongly with the chapter on the industrialism of the west, and shows how difficult will be the adaptation of these two, one to another. There is a discussion on Islam in India and of Hinduism, and the last three chapters are devoted to that strange pessimism which has such a grip on the oriental mind and a discussion of the physical and intellectual causes of this.

The South and East African Year Book and Guide for 1924. By A. Samler Brown and G. Gordon Brown. xlix + 919 pp. + 63 pp. maps, 19 x 12.5 cm. Sampson Lowe, Marston and Co., 1924.

Teachers who like to get up-to-date information for their teaching will be glad to know of this useful book. It contains in addition to the ordinary information as to routes, towns, etc., chapters on the climate, the effect of sleeping sickness, the Tsetse fly, irrigation, farming, etc.

Statistical Year Book of Quebec, 1923. xx + 419 pp., 26½ x 17 cm. Printed by Ls. A. Proulx, Quebec.

We have received the very important tenth year book issued from the Provincial Secretary's Department, Bureau of Statistics. The statistics include Chronology, Climatology, Movement of Population, School Organisation, Production, including Agriculture, Live Stock, Dairy Industry, Forest Industry, Fisheries, Mines, Fur-bearing Animals, etc. There are also important summaries of the means of communication, and the state of finance of the province of Quebec. Teachers will readily recognise the importance of having so up-to-date a source book for geographical facts available.

Place Names in Canada.

Those teachers who are interested in the historic side of the Province of Quebec will welcome three little reprints from the Report of the Geographic Board of Canada dealing with the place names (a) of Anticosti Island, (b) of Canadian City Names, and (c) of the Magdalen Islands. The statistical year book and the three place name pamphlets have been added to the Geographical Association Library.

Monthly Weather Bulletin. Nanking, China.

It is with much pleasure that we record that the Department of Geology and Geography, National South Eastern University, Nanking, has sent us its monthly weather record for February, 1924. Tables are given showing pressure, wind direction and velocity, temperature, relative humidity, precipitation, types of cloud, etc., etc., for each day, and other data are indicated by a careful system of conventional signs. The following table is of interest:—

Year.	No. of rainy days.	Min. Temp.	Max Temp.
1924	13	—5.6 deg. C.	14.0 deg. C.
1923	7	—7.1 deg. C.	14.0 deg. C.
1922	11	—4.1 deg. C.	17.7 deg. C.

We congratulate the National South Eastern University on its enterprise in establishing this Meteorological Station and publishing these valuable results of its observations.

The Evolution of Man. Essays by G. Elliot Smith. Oxford University Press, 1924. pp vi, 159, Oxford University Press. Price 8/- nett.

In this volume, Professor Elliot Smith has re-published three addresses—"The Evolution of Man," which was delivered as the Presidential Address to the Anthropological Section of the British Association at the Dundee Meeting in 1912; "Primitive Man," an address delivered to the British Academy in 1916, which now appears with an addition from the "Atlantic Monthly" referring to Rhodesian Man; and a discourse delivered at the Royal Institution in 1922. It is explained in the preface that their publication in the present form is due to the need for a book giving a consistent and coherent account of the essential factors in the evolution of man. We need not emphasize its value to students from this point of view, pending the publication of the larger text book which Professor Elliot Smith promises in due course. Nor is it necessary to mention in detail the topics with which the author deals in these addresses, although it may perhaps be worth while to remind the reader that it is in the first of these that Professor Elliot Smith dealt with the place and function of the neopallium in the evolution of man, while in the second he gave what is perhaps the clearest and most logical exposition of his views on the development of culture. It should also be mentioned that this volume contains a foreword in which the author gives tentative schemes for the order of development of the human family and the order Primates. Prof. Elliot Smith's views on these two points are well known, so that it is an advantage to have them set out here in a form in which they are readily accessible—an advantage which will appeal to a wider public than the students for whom the book was intended. E.N.F.

The Outline of British Trade. David W. Caddick. 159 pp. 19 x 12.5 cm. George G. Harrap and Co., Ltd., 1924. 3/6.

A well-arranged and clearly written introductory text book for the student of commerce or economics, but teachers desiring special information on this topic for higher work in connection with the geography of the British Isles will also find it of value. The history of commerce, particularly as set out in Chapter III (17th century) and Chapter IV (18th century) is very well stated. W.E.W.

The Home of Man—Africa. By W. C. Brown and W. Anderson. 198pp., 19 x 12.5 cm. George G. Harrap and Co., Ltd., 1924. 2/6.

This is the sixth and concluding part of Book II of the " New Outlook " Geography. Earlier parts have gained favourable comments, and the arrangement of the present volume is of a similar character. There are numerous printed diagram-maps, and the exercises scattered throughout the text, which form an important feature in this series, have been carefully devised. Pupils specialising in this region for the school certificate stage should find all reasonable examination requirements met by the book. **W.E.W.**

Wonders of the World. By Agnes Nightingale. 48 pp., 23 x 18 cm. A. and C. Black, Ltd., 1924. 1/-.

The principle of selection is not very clear, for the list includes such mixed items as Westminster Abbey, Mount Etna, Forth Bridge, Big Trees, Panama Canal, and two cities: Venice and New York. The line drawings are good, and the hints for colouring are useful. The notes are much too statistical and advanced in character for reading by the very young pupils for whom the book is intended, but the information seems to be accurate, and, in any case, is subsidiary to the main scheme, which has received favourable reviews for the earlier volumes. W.E.W.

" How Men Live." Portfolio " Schoolmistress." 3/-.

This is a novel and a very good idea. Probably the publishers are a little optimistic in their claims, and the production would need careful testing before it could be accepted as a solution of the difficult problem of teaching " Human Geography " to the younger folk. Nevertheless the scheme is well worth a trial. The material first appeared as monthly supplements to the " Schoolmistress." It is now being re-issued in a convenient form, and consists essentially of 12 large black and white backgrounds each 25in. x 17in., boldly but well drawn, and representing the stages on which various objects, animal (including human) and otherwise can be placed. The backgrounds are well chosen, and really represent the main features of the area under discussion. The animals, erections, etc., are on separate sheets; they can be cut out and placed in their correct positions according to coded sketches, and through the artist's careful attention to scale, three or four quite accurate pictures can be built up on any one background. The sheets are of stout paper, which takes colour well. In addition there is a complete geography scheme for one year built up around the pictures. Miss E. G. R. Taylor is responsible for the geography notes, and they are well compiled and are particularly sound in their geographical outlook. Finally, the " Infant Teachers " will find much of value in the twelve stories on the subjects of the pictures, which have been prepared by Miss F. Hoatson. W.E.W.

The Teaching of Geography. W. P. Welpton. 17½ x 12½ cm., pp. xi + 159. University Tutorial Press, 1923. 3/6.

Of books on the teaching of geography there can be no end, and as long as a writer has a serious message to deliver he will always gather together a big circle of readers. Mr. Welpton *is* serious, deadly serious in places, and everywhere his message deserves consideration. Not that there will be universal agreement with his precepts, but he disarms much criticism by his preface. In summary, he says that three persons are essential, (a) the educationist, determining the scope of the topics, (b) the geographer, supplying material, (c) the practical teacher, or, as the metaphor strikes the reviewer, (a) the architect, (b) the quarryman, (c) the mason. Mr. Welpton speaks primarily as the architect who has visited quarries and has acted, on occasion, as foreman mason. He does not claim all this, but his book demonstrates it. He says that the title of the book is misleading, as his topic is really " the educating of pupils " rather than the " teaching of geography," i.e., making little architects and not little quarrymen. He is very insistent that " it is not the teacher's business to train little geographers, cartographers, surveyors, meteorologists, but men and citizens interested in, and intelligently enlightened on, the problems of the world and its peoples." Apparently from this, little geographers are a race apart from those who develop into the men mentioned later. One might retort that the business of the geography teacher is not to train little missionaries, little diplomats, little politicians, little prigs, and so on. There *is* a school subject in geography *qua* geography, equally with, say, arithmetic *qua* arithmetic. The business of the arithmetic teacher is to teach arithmetic, but even this need not be divorced from the "problems of the world and its peoples." But Mr. Welpton is forgiven for, however frequently he dons the neat black and white of the architect, he has other suits also, and we hope that he did not get his overalls too dusty when he quarried those nice, well-shaped stones in connection with New York, Chicago, and Flamborough Head. Quarrymen and masons are strongly recommended to get this interesting booklet on their occupations. W.E.W.

Das Problem der Klimaänderung in geschichtlicher Zeit. L. Berg. Geogr. Abhandl. (Penck). X2, Berlin, Teubner, 1914. 70 pp.

Correspondents ask for sources of information critical of the Ellsworth Huntington view of pulses of climate in Asia, and we therefore make no excuse for noticing this nearly ten year old work, especially as owing to the war it was not well known in England until quite recently. Berg accepts the view that considerable changes of climate followed one another as the N.W. European Ice Sheets receded in early prehistoric times, but he does not think that there has been anything of first-rate consequence in this line since then. His work is specially valuable for his multitudinous references to Russian works dealing with interrelations of steppe and forest, and he shows how increased pastoral exploitation leads to degradation of the drier part of the steppe. This occurs because the soil gets exposed through kicks by running animals, and the wind then dries it and carries it about to the detriment of the grassy patches. Berg believes, and he alleges a good many points in evidence, that the forest would tend to spread into the steppe if it were left to itself, and he thinks this has been true for a very long time. He would, however, by no means exclude the possibility of occasional optimum and pessimum periods. He asks for fresh observations on the supposed variations of the level of the Caspian and of various other points brought forward by the pulsationists. We cannot but ask whether a short optimal period would be sufficient to encourage the building of the cisterns of Palmyra? But, on the whole, the case against climatic changes in historic times is put exceedingly well, with moderation of statement, carefulness of thought, and industry of citation beyond reproach.

NEW EDITIONS.

Elementary and Commercial Geography. Mill and Allen. ix + 194 pp, 19 x 12.5 cm. Cambridge University Press, 1924. 4/-.

The first edition of this very valuable synopsis appeared as far back as 1888, and the present—5th—edition retains very little of the original book except its arrangement, which would be difficult to improve. The statistical information is brought up to 1920 for most items, but a few returns, e.g., in connection with Britain, are still later. Part II, "Countries of the World," remains, as always, a valuable reference section, but Part I —48 closely printed pages—which sets out the "General Principles of Commercial Geography," might, with advantage, be issued separately for more extended use. It would make excellent foundation material for any general geography course.

Surveying for School and Scouts. W. A. Richardson. vii — 110 pp., 19 x 12.5 cm. Messrs. George Philip and Son, Ltd., 1924. 2/6.

It is ten years ago since the first edition of Dr. Richardson's book appeared, and the book has stood the test of time so well that little has needed alteration. It is written by a practical man who knows both the value and the limitations of his subject for ordinary school use. Where surveying is an important feature of the practical geography course, the pupils can be trusted with the book, and the explicit directions will save the teacher much time and thought in the organisation and control of the work.

The Junior Scientific Geography. Ellis W. Heaton. pp. vii + 142, 18½ x 12½ cm. Herbert Russell and Co., London, 1924. 2/3.

The main features which made this book so attractive to a large number of teachers when it first appeared in 1911 have been retained, but this 2nd edition contains revised material, and has an appendix showing the chief territorial changes brought about by the war. The book is very "meaty," and the information is sound, but it is still neither very easy nor very attractive to read. Against this must be placed the fact that a pupil who did know its contents would probably be better fitted to take senior work than a pupil reared on the "soft-mash" diet of so many recent text-books.

Philips' Handy Gazetteer. George Philip. 197 pp., 19 x 12.5 cm. George Philip and Sons, Ltd., 1924. 3/6.

This handy reference volume—pocket-size—has been well revised, and contains some 17,000 references to physical and human settlement features of the British Isles. The 1921 Census figures have been used, and an ingenious system of abbreviations has allowed of the presentation of a large amount of material in small bulk. It is rather unfortunate that the reference list of abbreviations, though containing the important information that ft.=feet and sq. m.=square miles, leaves us guessing as to the meaning of "g.c." A rapid test of several items in the body of the volume has proved the accuracy of the portions tested.

The New Preliminary Geography. H. B. Wetherill. xiv — 184 pp., 19 x 12 cm. Mills and Boon, Ltd., 1924. 2/6.

This book, by the author of " The World and its Discovery," now appears in a ninth revised edition. The book is intended for the higher standards of elementary schools. The classified bibliography is one of its best features. An attempt is made to cover the whole world, and consequently there is considerable unavoidable condensation, though something might have been gained by an alteration of balance in the book. The " page and a bit " of text given to Wales would hardly give a pupil any real idea of that land, particularly as there is a fairly long disquisition as to the kinds of coal. Anglesea is the only county named; eight towns are mentioned (three of them twice), but there is no reference to seaside resorts. Ireland gets a longer chapter, and Scotland gets three, and even these hardly contain the minimum of knowledge of the home lands which should be possessed by children " whose education at school ceases at fourteen." The paucity and in many cases the entire absence of names on the 17 maps is certainly a good illustration of " limiting the place names as far as possible," which the author mentions in his introduction. The occasional omission of explanatory tablets to the maps is also a defect. The book has good points, but it has hardly yet solved the problem of a complete preliminary geography.

The Oxford Advanced Atlas. Bartholomew. 38 x 24 cm. 96 pp.—31pp. General Index. Oxford University Press, 1924. 10/6.

The 2nd edition of the " Advanced Atlas of Physical and Political Geography " has now appeared with the above shortened title. The numerous enquiries made for second-hand copies when the first edition ran out of print showed that the Atlas was well-known and appreciated. Apart from necessary alterations of political boundaries there are several modifications in the new edition. The chief changes are summarised below. The new " magnetic variation " chart is dated 1922 in place of the original 1915 chart, and shows Burma with a western variation instead of its earlier eastern variation, and the " Siberian Oval " is much modified. The Commercial Development Map has been improved in an interesting manner, while the " Mapping of the World " Chart has been dropped in favour of a new " Chief Occupations " diagram. A welcome re-arrangement is the printing of Physical and Political Maps for Ireland on opposite pages; the same alteration has been made for Scotland. The maps of Europe have been re-paged in certain cases, and the new arrangement is an improved one. " Central Europe Vegetation " now disappears, but the new " Italy and Austria " map is an excellent feature. The previous atlas was unsatisfactory with regard to Scandinavia, but the new " Scandinavia and the Baltic States "—a fine double-page map, removes this reproach. The " World Political Divisions " has Japanese territory replacing German in the colour scheme, but the solution of the colouring of Minor Powers territories still seems to be postponed. A new feature on the same map is the indication of the relative importance of the routes followed by steam-ships. The old " Malay Archipelago " is replaced by a much improved orographical " East Indies " map; a similar change has been made for the " West Indies," which is now a full-page orographical map at the sacrifice of the original half-page Mexico map. South Africa Vegetation one-page is now a double page orographical. " Oceania " shows much improvement in its mapping of ocean deeps. There are numerous alterations in tints, many of them being distinct improvements, particularly as in the case of " The World—Geological." The other marked alteration is the omission of the larger scale city-plan insets. This is a step which will be regretted by many students; it has certainly allowed of the inclusion of a little more border material in the case of some of the maps, and in all cases has resulted in a more dignified sheet, but these represent mixed blessings in the light of the parts sacrificed. W.E.W.

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